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DAVOS.

DAVOS,

ITS

LOCAL, PHYSICAL, AND MEDICAL ASPECTS.

A Practical Handbook for Physicians and Patients.

EDITED BY

W. H. VORMANN.

London:
PROVOST & Co., 40, TAVISTOCK STREET, COVENT GARDEN,
1882.

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PREFACE.

The object of this little book is to act as a faithful guide to the physician as well as to the invalid. All the information it contains is founded on the personal experience and observation of the authors; each of whom has spent many years in Davos. The reader will, therefore, find in it facts only, never mere suppositions, whose basis is an empty *on dit.*

The first part of the book, the composition of which I have undertaken, deals with the local aspects of the place, and I have considered it fitting to devote an entire chapter specially to social life in Davos, having often had occasion to notice personally that the greatest errors and misunderstandings occur on this very point. Hotel prices are briefly mentioned in order to facilitate a general calculation of the expenses to be incurred.

The author of the second, and, in fact, principal part, is W. Steffen, a well-known meteorologist, who has for the past five years, held the post of Observer at the Meteorological Station at Davos. He has compiled in this treatise, which appeared at first in 1876 in pamphlet form, the results of his exact and carefully made observations, and up to the present day it may undoubtedly be considered the best which has appeared on the subject.

The English translation has been made with constant reference to the author, and I trust it will be found that the style and meaning of the original have been followed as strictly as possible.

All measures have been converted into English ones with the greatest exactitude possible, and, when it seemed necessary, extracts from other treatises on the same subject have been translated and appended as foot notes.

If, in spite of the care which has been taken, mistakes should occur, every apology is made to the reader.

The third part, treating of the indications and counter-indications of Davos, is the work of a German physician, Dr. O. PETERS, who has resided there for some years. It was first published in the *Edinburgh Medical Journal*, and has kindly been placed at my disposal by the author.

In conclusion I have still to fulfil the pleasant duty of presenting my warm thanks to all who have assisted me in my undertaking, particularly to my faithful co-worker, M. LAWRENCE, and to Messrs. STEFFEN, Davos, and A. K. BROWN, Norwich.

MERAN. W. H. VORMANN.
January, 1882.

NOTE.—It was hoped that this work, which was begun in April, 1881, would have been ready for the press by the end of the summer, but owing to the illness of the Editor the translation progressed more slowly than was expected.

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III. MEDICAL ASPECTS.

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THE LOCAL ASPECTS OF DAVOS.

HISTORY.

THE history of the Landschaft (district) of Davos, whose chief place has always been Davos-Platz—" Der Platz bei der Hauptkirche St. Johann"—can be authentically investigated as far back as the second half of the thirteenth century.

The oldest accredited document which we possess on the subject is a bill of feoffment,* dated from the 18th day of St. Bartholomeus, 1289, in which the Landammann (mayor, chief magistrate), Wilhelm, and his followers are invested with the Estate of Davos.

Among other things, it is there said, that the feudal lords, the Counts of Vatz and Werdenberg, guarantee full freedom to the feoffees, that they grant to them the right of free election and self-jurisdiction; and, lastly, that they will afford them all the help and protection of which they may stand in need. In return for these concessions, the vassals engage themselves to deliver an annual tribute of 473 cheeses, 168 ells of coarse cloth, 56 sheep, and 1,000 lake-fish; moreover, to give the feudal lords free quarters for themselves and messengers when required. "In case of refusal the Landammann must furnish security with his property—*i.e.*, with his cattle, goats, and sheep—for the tribute due," says the last paragraph of this curious document; but, apparently, the Counts never required to resort to this extreme measure. In the following centuries other families came into possession of the Landschaft, partly by inheritance, partly through marriage, and partly by purchase; all, however, might their names be Toggenburg, Montfort, or Maetsch, established the rights of the Davos inhabitants, and none ventured to attack their freedom. It was first in the seventeenth century that such an attempt was made. The House of Austria, which had again taken the country, in 1478, from the Count of Maetsch, began gradually to increase its originally insignificant rights.

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* A copy of this document is preserved in the Town Hall of Davos. The original no longer exists, having been taken and probably burnt in 1622 by hostile troops.

The liberal feudal lord became in course of time a strict ruler, the, at one time almost free vassal, an oppressed subject. The Swiss were treated with inflexible rigour, and their ancient rights were violated by insolent hands. When, however, in the years 1621-22, the government went so far as to attempt to abolish religious liberty, a cry of rage went through the whole land. All the inhabitants rose in arms against their oppressors, and with heroic bravery they brought the war to a successful termination.

The year 1648, the long wished for end of the Thirty Years' War, gave back to Davos its ancient liberty, and to the present day it has been maintained intact.

In after-times the Davosers were destined but seldom to play a *rôle* on the stage of the world's theatre, and at the beginning of the nineteenth century they had entirely disappeared from public notice.

"Dafaas (yonder), where the wolves live and the bears hold *rendezvous*, who would wish to go there?" said the inhabitants of the neighbouring towns, and but few travellers strayed into this unknown district.

The natives—robust figures with weather-tanned faces and dark hair—either made their way through the world as confectioners, or remained at home and occupied themselves with agriculture as their forefathers had done. Most of them kept cattle, some few traded with the red wine of the Valtelline, which was brought with much difficulty into the valley over the Scaletta and Fluela passes, and the poorer inhabitants of the village earned their daily bread by carving rough wooden objects, such as sledges, children's toys, forks, spoons, etc.

It was reserved for the second half of our century to produce again an entire revolution in these simple habits. In the year 1862 Dr. Alexander Spengler, country physician at that time in Davos, communicated to Dr. Meyer-Ahrens, on occasion of a visit from the latter, that, during the many years of his residence in this place, he had not met with a single case of pulmonary consumption, but, on the contrary, that Davos artisans who had become phthisical in the lowlands, always recovered their health quickly and perfectly on returning to their native place. From his experience, therefore, the air of Davos should be considered as an excellent remedy for not too far-advanced chronic tuberculosis. Dr. Meyer-Ahrens, who immediately recognised the value of this weighty and important communication, made known the tenor of the conversation in an article entitled, "Balneologische Spaziergaenge," which was published in the same year in a supplement to the medical journal *Deutsche Klinik*, and which was immediately copied by numerous Berlin and Saxon newspapers. This article, causing a great sensation in all public circles, induced two invalids, Dr. Friedrich Unger and Hugo Richter, bookseller, who had in vain sought health in Dr. Brehmer's Establishment at Goerbersdorf (Silesia), to pay a visit to Davos. They put themselves in communication with Dr. Spengler, the climate suited them so well that they decided to settle in Davos. and the united endeavours of the two physicians succeeded in course of time in transforming the quiet little village into a well-known health-resort. In quick succession new hotels were built which entirely threw the old ones (Rathhaus and Strela) into the shade. A Kurhaus, by means of comfortable accommodation and elegantly-furnished rooms, met even the most exacting claims. Many new roads were made, those previously existing were improved, and soon the old place presented quite a new appearance. With the years increased the success. The favourable climate, and the method of cure introduced from Goerbersdorf by Dr. Unger did their work; many patients returned to their homes cured, and every new year brought the place new fame, new advocates, and new friends. Whilst, in the season 1866-67 twelve, 1867-68 twenty-five, 1868-69 fifty, 1869-70 seventy invalids had wintered in Davos, these numbers rose in 1870-71 to ninety, in spite of the Franco-German War, and the place now rapidly became more frequented. In 1871-72 the statistics show one hundred and twenty names, 1872-73 two hundred, 1873- three hundred, 1874-75 four hundred, 1875-76 five hundr 1876-77 five hundred and fifty, 1877-78 five hundred and six 1878-79 seven hundred. The “Strangers' List” for 1879- however, shows the highest figure, Davos then being visited eight hundred persons, a figure which in the following seas 1880-81, was not exceeded.

English medical men, who had for a long time watched progress of affairs in Davos, interested themselves more more in the new health-resort. Eventually some of them visi the place in order to acquaint themselves personally with local and medical aspects.

Chambers' Journal and other periodicals published favour articles, and now, too, English people arrived in great numbe

The hotels Buol and Belvedere, which up to this time had ceived all nationalities, transformed themselves into al exclusively English houses, an English quarter collected u its flag those of Queen Victoria's subjects who had hitherto scattered about in the various hotels, and the English co soon grew rapidly in numbers.

In the winter season 1880-81 no less than 246* English-sp ing people resided in Davos, and there is every prospect that number will increase from year to year.

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* On January 20th, 1881, the “Strangers' List” contained the foll numbers:—

Germans	347
English and Americans	246
Dutch	53
Swiss	35
Russians and Poles	26
Belgians	18
Other Nations	31
Total:	756 Visitors.

THE JOURNEY.

ALTHOUGH the winter season begins with the 15th of October, yet most of the patients arrive in Davos a month later. Many, however, have cause to regret this imprudence and to reproach their doctor for not having advised an earlier departure.

It is precisely in November that the critical period begins, which the inhabitants call the "Einschneien" (snowing-in), and which brings to the invalids so many tedious hours. Now it is that the air becomes thick and heavy, the sky is covered as far as the eye can reach with leaden-grey clouds, and from the meadows a light mist arises which like a veil enfolds the landscape. Then suddenly the first flakes fall, first so tiny that the eye can scarcely distinguish the small crystals, but quickly increasing to a size which astonishes the lowlander. Huge snow-hills pile themselves up on the terraces, and enormous snow masses make the roads almost impassable. Only with trouble can the driver keep the open sledge in the right track, the shivering passengers wrap themselves in their fur cloaks, and the horses, covered with sweat, laboriously make their way through the sticky snow.

If, in addition to this, a violent storm arises, as not unfrequently occurs at this time in the mountains, the traveller's plight is indeed a sorry one, and in a miserable state will he at last arrive in Davos. All these disadvantages would be avoided if English doctors could be persuaded to send the patient to Davos at the end of September, or, at the latest, early in the month of October. A beautiful blue sky would then smilingly greet him, a warm sun would make him forget the fogs of his native land, and he would become acclimatized almost unawares before the severe winter sets in.

The journey from London to Davos can be made in three days by a good traveller; an invalid, however, requires from five to six days to accomplish it comfortably. The most practical way is to procure a through ticket provided by Messrs. Henry Gaze and Son, 142, Strand, London, W.C., or Thomas Cook and Son, Ludgate Circus, London, and which saves the invalid traveller so many inconveniences. Its price is not higher than the ordinary fares, and it ensures *en route* (particularly in Paris) the assistance of the company's conductors who meet the principal trains at the various stations.

Such tickets are issued for first and second classes, and embrace only the sea passage and railway journey, so that for the latter part of the journey (by Diligence to Davos) a fresh ticket is required.*

In conclusion a few words may be said concerning the drive to Davos by Diligence. This should be made during the winter season from Landquart and not from Coire, because—

1. This route is the shorter one;

2. It saves the invalid from rising early, the Diligence from Coire starting at 7 a.m.;

3. The most frequented hotel in Landquart (Hotel Landquart, comfortable but unpretending), is very near the Railway Station and in direct connection with the posts.

The Diligence† in winter leaves Landquart at 10 a.m., and after having passed Gruesch, Schiers, Jenatz, and Fideriser Au, it makes the first important halt at Kueblis, where the horses are changed and time is allowed for dinner. The road now begins to ascend, and the beauty of the surrounding scenery increases. The coach goes through Mezza-Selva, Klosters, Ober-Laret, Davos-Dörfli, and at last Davos-Platz, the end of the journey is reached. The Diligence drives through the entire village, and finally it stops before the modest Post Office, whose broad doors hospitably open to receive the passengers. The porter takes the luggage under care, and a few minutes later the traveller is greeted by the master of the hotel which he has chosen.

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* If no *Through Tickets* can be obtained from London to *Landquart* the invalid traveller is strongly advised to take a through ticket from London to *Coire*, and to get out at Landquart—two stations after Ragatz—where he takes the Diligence for Davos.

† It is best to telegraph beforehand from Bâle in order to secure a place, Intérieur, ten francs fifty-five cents., Coupé, from which a very good view is to be had, thirteen francs forty-five cents.

HOTELS, PENSIONS, PRIVATE HOUSES, &c.
GENERAL HINTS ON CLOTHING.

WHEN the traveller of the present day arrives in Davos, seven large and five small hotels are ready to open their doors to him; two small pensions receive him with outstretched arms, whilst one Hotel Garni promises every comfort which such an establishment dares to offer. If, on the contrary, he desires to lead a hermit's life, about twenty-five private houses stand at his disposal, which, in part elegantly, in part simply furnished, are able to meet all his requirements. The prices for pension (board and lodging) vary in the hotels from six to ten francs daily, but it is also possible to live in Davos for five francs, and even less, if a private room (price from fifty centimes to three francs, according to the position and height) is hired, and only meals (three to five francs for dinner and supper) taken in an hotel.

Service (one franc fifty cents. to two francs fifty cents.); Music (fifty cents., only paid in the large hotels); Kurtax (one franc) per week; wine (from one franc fifty cents. per bottle); milk (fifteen cents. per glass); candles (thirty cents. each); washing* and all other special requirements must be paid for as extras.

The arrangements in the hotels are, on the whole good, and in some, even excellent. The kitchen is generally underground, so that no smell of cooking annoys the invalids.

---

* The prices for washing are different in the different hotels. In Hotel Kurhaus. for instance, the following charges are made:—Stockings, ten cents.; cuffs fifteen cents.; collars, ten cents.; and day-shirts, forty cents.; whilst Hotel Strela reckons as follows:—Stockings, cuffs, and collars, fifteen cents., and day-shirts, forty cents. See "Frobeen's Hotel Guide through Switzerland," pages 17 and 18.

Many public rooms—in the larger hotels Conversation-room, Ladies' Drawing-room, Billiard, Reading, and Dining rooms, in the smaller ones at least Conversation and Dining rooms—are to be found. The Bedrooms are well furnished and generally well ventilated; the corridors are broad and airy, and are warmed in winter; the stairs are carpeted throughout.

The Kurhaus is provided with a Lift, and is heated by hot-water pipes, a system which is also used in Hotels Schweizerhof and Post; in addition to this, it possesses—as I wish particularly to mention—a comparatively large Smoking-room, which is very suitably placed in an adjoining building. Smoking being unfortunately a passion which but few can quietly give up, it is not possible to banish tobacco entirely from Davos, as would undoubtedly be desirable. It is, however, an hotel-keeper's duty not only to limit the smokers to one room, but also to arrange that this room is so placed that ladies and great invalids are not incommoded by the smoke.

The attendance in all the hotels is good, considering the comparatively moderate prices.

The meals are served according to the French custom, being generally taken at twelve (lunch) and half-past five (dinner), and consist principally of nourishing meats (beef-steak, roast beef, etc.) and light vegetables. The most favourite table beverage recommended by the physicians is the so-called "Veltliner," a red wine containing much tannin, which takes its high-sounding name from the beautiful Italian valley of the Valtelline. Besides this, much Hungarian wine is drunk, and, when ordered by the doctor, cognac, pure or with water and sugar as grog, etc.

Not only, however, is provision made in Davos for the hunger and thirst of the visitors, but the other bodily and spiritual requirements are also well cared for. Four Deaconesses* impart their gentle services to the invalid. Three ministers[*] are ready to speak words of comfort and hope to him when he begins to despair. Seven doctors, two of whom speak English[†] do all in their power to assist him in recovering his lost health, and in this difficult task they are aided by two chemists, in whose shops all necessary drugs are to be had, and all the English patent medicines to be procured. Seven teachers of languages and two large scholastic establishments[‡] impart instruction in all the sciences to young and old, whilst two artists have the satisfaction of being sought by many scholars, and a professor of music assisted by his wife gives lessons in the art of singing, pianoforte playing, etc. One dentist delivers martyrs to the toothache "from all future pain," and a lending library in connection with a bookseller's shop, as well as a collection of scientific books, fulfill all the requirements of literary taste.

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* The Deaconesses, who come from Carlsruhe, are under the control of the "Evangelische Kurgemeinde," or, to speak more exactly, of the German Pastor appointed by the Society. According to the Eleventh Annual Report, three deaconesses were actively employed during the whole year; in the winter 1879 to 1880 this number was increased to four, and in that of 1880 to 1881 for two months five Sisters were engaged in Davos. These five Sisters have nursed during the course of the year 144 patients, and have imparted 819 "daily services," 674 "nightly services," 525 "hourly services," and in addition to these they have rendered 1,680 smaller services. Besides this, they have undertaken five journeys in accompanying invalids to their homes.

Seven shoemakers are eager to protect the invalids from all danger of wet feet, two hair-dressers to cut their hair according to the newest mode, three butchers are a vexation to the Davos vegetarian, two blacksmiths strike the iron while it is hot, and four tailors and five dressmakers essay to follow the Paris fashions step by step. The sums of money required by the Davos Kurgast call forth our astonishment, but this ceases when we consider that seven bazaars exist to lighten the purse, and that three public restaurants in which wine and "bock" are dispensed, help them in this work of love. Two confectioners make it their business to pamper to dainty appetites. One liquor manufactory embitters the life, whilst the foreign wines of four wineshops make it sweet.[§]

Lastly, may I be allowed to say a few words upon the clothes required during the winter season in Davos. Although in t middle of the day it is very often extremely warm in this pla so much so indeed that one might imagine it to be the height summer, still the early mornings and the evenings are intense cold. (*Vide* Meteorological Tables in the second part.)

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[*] There is Divine Service each Sunday in the Hotel Belvedere. at 10.30 a.m. and 3.45 p.m. Holy Communion on the first and third Sunday in the month. The Chaplain of Davos, appointed by the Colonial and Continental Church Society, was, during the season of 1880 to 1881, the Rev. J. P. Courtenay.

[†] Dr. Ruedi and Dr. Peters. The others speak French and German.

[‡] 1. Educational Establishment for Young Ladies, conducted by Frau Rittershausen and Fraulein Otten. 2. "Fridericianum," College for Young Gentlemen, Proprietor and Director Geheimer Hofrath Dr. Perthes. Director *(pro tem.)* Dr. Schaarschmidt. Terms (including board): 3,000 francs per annum. Since writing the above, I am informed that Mr. J. W. Lord, M.A., Fellow of Trinity College, Cambridge (Senior Wrangler, 1875), takes a limited number of pupils to prepare for Entrance at the Universities, Entrance Mathematical Scholarships, or other Examinations. Terms (including board), £150.

[§] It will easily be understood that these numbers change from time to time.

It is consequently necessary that clothing be provided to s these circumstances. Before all it is important that the und dress be of wool, and woollen stockings should be worn duri the whole season. Walking boots can best be ordered in Dav they should fit easily and be made water-proof, so that long wal may be taken in the snow without the feet becoming wet. T prices for boots answering all purposes vary from twenty-five thirty francs. Over-shoes are more convenient for ladies, for sanitary reasons are not to be recommended.

Gentlemen's suits should be of thick texture, because then t variations of temperature will be less felt. English "med cloth" is to be preferred, all plain colours (especially brown a blue) becoming easily faded by the intense solar rays.

Winter and summer overcoats must not be forgotten, a shawls and railway-rugs are almost indispensable. Delicate p sons and those suffering from cold feet will find a fur foot-war a great comfort; a very good one can be bought in Davos eighteen francs.

Fur coats are of use on the journey; but in Davos itself ordinary great coat is amply sufficient.

The final requisites for the invalid which remain to be m tioned are a straw hat, a light-coloured sunshade, and blue sp tacles. All these things, however, may be had in the Da Bazaars for moderate prices.

WALKS AND EXCURSIONS.

In summer there are many lovely walks to be taken in Davos. Beautiful mountains with extended views invite us to ascend them, charming side valleys with green meadows delight the eye, and shady pine woods refresh us with their aromatic fragrance.

Flowers of all species and colours rejoice the botanist, rare minerals fill the geologist's knapsack, rushing water-falls and romantic clusters of rocks furnish material for the artist's pencil, and even the most exacting of travellers will find scenery which astonishes him with its wild beauty. In winter, on the contrary, the walks are limited in number; then the high road, which after every fall of snow is carefully levelled by sledges especially constructed for the purpose, is at the service of the visitors, and on the mountain slopes zigzag paths—the so-called "Invalids' Walks"—are cleared, so that a walk to the Schatz-Alp, a thousand feet above Davos, is possible, notwithstanding the deep snow which covers the ground.

The remaining side-ways are but little frequented, the "Landstrasse" (high-road) being the favourite promenade where the visitors meet; the English have therefore given it the name of the "Corso of Davos."

Numerous seats are placed there for the use of the visitors by the Kurverein, a society formed for the purpose of improving the place, constructing new paths, and making many other arrange-

ments in order to render the visitors' stay in Davos as agreea
as possible. Surrounded by snow they can sit here and
themselves, thus verifying Scheffel's famous words,—

> " Still liegen und sich sonnen.
> Ist auch eine schoene kunst."
>
> To lie and bask in sunshine
> Is also a beautiful art.

It is only in the evening when the sun has set, and the bells
for dinner that the roads become empty and deep silence falls
the place.

A list of the principal walks, excursions, and drives, is give
the following table :—

LIST OF WALKS, EXCURSIONS, AND DRIVES, IN THE NEIGHBOURHOOD OF DAVOS.

From DAVOS PLATZ to	Height above the Sea-level. Feet.	Hours. There and back.		Fares for Carriages and Sledges. There and back.				Regulations for Carriages and Sledges. See also the Davos Street **Regulations in Appendix.**
		Walking	Driving.	One Horse. Frcs.	Two Horses. Frcs.	Three Horses. Frcs.	Four Horses. Frcs.	
(*Vide* Hoffungsau)								
Schwarzsee	4954	3¾	2¼	7	14	18	22	7. Two persons with 50 kilos (112lbs.) weight of luggage, must for a one-horse carriage pay the fare of three persons. In carriages with two horses luggage to the amount of 125 kilos (280 lbs.), with three horses 150 kilos (336 lbs.), with four horses 200 kilos (448 lbs.) is allowed. **Remarks**:—**Frcs.** 10 per horse must be paid for each day's stoppage, driver's gratuity not included. The above regulations and fares serve also for sledges.
Schwarzhorn ...	8787	6 P	...	...	...	...	...	
Schyahorn	8925	5¼P	...	...	...	...	...	
Seehorn	7680	5 P	...	...	...	...	...	
Sertig Doerfli ...	6104	7 S	4½	11	...	...	...	
Spinabad	4593	2¾	1¾	6	12	17	20	
Strela Alp	6431	2¼	...	...	...	...	...	
Strela Pass	7799	4 P	...	...	...	...	...	
Todten Alp	7640	4 P	...	...	...	...	...	
Tschuggen ... ... (*Vide* Alpenglocke)	...	...	...	...	...	...	...	
Waldhaus	5120	¾	½	...	...	...	...	
Wannengrat ...	8247	5 P	...	...	...	...	...	
Weissfluh	9263	8 P	...	...	...	...	...	
Wiesen	5098	7	4	13	24	35	42	
Wolfgang ... ... (*Vide* Davos Culm)	...	...	...	...	...	...	...	

N.B.—Those walks and excursions which are almost or quite impassable in winter for foot passengers (invalids) are marked with P, or sledges with S.

OUTDOOR AND INDOOR AMUSEMENTS.

ON the whole, Davos is by no means so dull and dead-alive as most people in England would imagine.

At times, on the contrary, a very gay life pulsates in its veins, and in January, when the season is at its height, comparatively few will be found among the visitors to complain of *ennui*. The inhabitants of the large hotels in particular know how to amuse themselves thoroughly, sometimes so well that they willingly renounce the winter gaieties of the lowlands. Then, on fine days sledging parties are set on foot, toboggining (I shall describe this sport further on) is the order of the day, walks are taken, whilst those who are too lazy to walk, sun themselves on the terraces. When the weather is unfavourable the time is spent in playing round games, and, when these are exhausted, in reading and working. A much approved amusement in such cases is also the Spelling Bee, and during the last season the inhabitants of the Hotel Belvedere have by its aid passed many long hours. The suggestion to arrange such a gathering is always received with acclamation, and, although no laurel wreath awaits the victor, yet he may be sure of a fair amount of cheering, and possibly of being triumphantly chaired through the corridors.

A still more favourite diversion, the exercise of which depends, however, upon the doctor's permission, is "Toboggin," *i.e.*, descending an inclined plane of frozen snow on small wooden or iron sledges. Young and old, ladies and gentlemen, do homage to this strange sport, and it is furthered in a high degree by the Kurverein, which has had grounds expressly prepared for the purpose.

Generally, the rider sets himself astride on the small low sledge, holds in his hand as a bridle the cord which is fastened to its head, and guides the "wooden horse" by lightly touching

the ground with his heel. Others prefer to whirl down the i
cline in a lying posture with the face to the ground, whilst othe
again kneel on the right knee and steer with the left foot.

The ladies either toboggin alone, and in this case they alwa
take the position which the German students employ in the s
called "Fuchsritt," or they relinquish the control of the sled
to their cavaliers, sitting or kneeling behind them.

The costume of the gentlemen is a close-fitting jacket, tig
pantaloons, enclosed by yellow leather gaiters, thick mount
boots, which, on account of their clumsiness, have acquired
name of "coal barges;" and variegated caps, called in Scotla
"Tam-o'-Shanters." The gentle sex, on the other hand, ge
rally wear the "robe ronde," over it a light-coloured waterpr
and on the feet wide laced boots, which leave nothing to be
sired in point of comfort and ugliness. The rapidity with w
the sledge slides down the path is astonishing, so much so,
if the snow be hard and smooth the passage of a distance of
feet in scarcely one minute is by no means uncommon.

Another sport, also controlled by the doctor, which takes
place of toboggining when the snow is too soft for the sledg
skating. Two moderate-sized skating-rinks exist in Davos
of which was made in December, 1876, the other in Jan
1881, and both are much patronized by the public. It is, in
an indescribable delight to glide along on the mirror-surface
in bright sunshine and surrounded by Nature's beauty—

> "To dance, to float on sounding mere,
> On silver crystals here and there."

and I can well understand that lovers of skating devote
selves to this pleasure with passion. English and Ger
natives and strangers, are alike eager skaters, and but sel
anyone found who from principle is averse to the sport.
few invalids to whom it is forbidden, try to satisfy themsel
looking on, and, sitting over their cups of coffee, rejoice
gay spectacle.

They chat, they laugh, they amuse themselves as well a
ble, and applaud when some too daring skater loses his ce
gravity. All nations, all ranks, are here represented; one
to be looking through a kaleidoscope, so rapidly do the
and colours change. Meanwhile, the musicians play their

melodies, and the sky is so blue, the sun so warm that the spectator could imagine himself transported to Nice or Mentone, did not the snow and ice remind him too forcibly of Davos.

All these dissipations fall into the background when December draws to a close and Christmas with its festivities approaches.

Then garlands must be wound, paper roses made; dark fir-cones wait for their silver, and brown walnuts for their gold dresses; then must a thousand things be attended to which may heighten the splendour of the festival. The chosen representatives of the hotel, the so-called Christmas committee, develope a feverish activity. In all the streets, in all the shops, the well-known faces are to be seen, and capacious baskets, filled with large and small presents, are brought into the hotel.

At last the important day arrives. The bell rings, and all hurry to the rooms in which the celebration is to take place. Broad garlands, whose dark green is agreeably softened by red and white roses, surround the arms and flags of the nations represented in the house. At the top of the room glitters the splendid Christmas-tree, lit up by innumerable candles, and beautifully decorated with golden chains and coloured ornaments, whilst on long tables on either side of it the gifts are arrayed which, during the course of the evening, are to be presented to the guests. The whole produces an imposing and solemn impression. Soft music is suddenly heard in the room, and joyously the children's voices join in. They are singing the Christmas hymn, "Hark the Herald Angels Sing," the "old familiar strain," for which, "untired, we ask and ask again."

Deep silence reigns in the spacious room. Doubtless everyone is thinking of the dear ones at home, and of the time when he was in full health, and with his family circle watched the burning of the yule-log. Presently the music ceases, and in the children's midst steps the pastor, a grey-headed man, of tall figure and noble countenance, whose deeply lined forehead betrays the thinker. With earnest, heart-seeking words he addresses the company, and, at the conclusion of his speech, many an eye which had before looked indifferent, now becomes moist, and many a heart beats faster.

A cheerful melody forms a suitable prelude to the distribution of the presents, which now follows; and this having taken place with great animation, the pleasant festival is ended.

On the following day, however, the company once assembles in the dining-room of the hotel in order to gi whole a becomingly worthy termination. The minister h service, and, amidst the sounds of well-known carols, one of the Creator and of home.

When the festive season is over, and every-day life has ret the visitors again sigh for change. The German Theatre Co which plays every day, in turn, at the principal hotels, su in drawing but a small number of the English, most of w not understand the language sufficiently to be able to follo the actors say. The necessary consequence is that one se some other way of passing the time, and, in most cases, th of this seeking will present itself to the public in the s Tableaux Vivants. An artist, or some other clever ge who feels called to it, takes on such occasions the subject i and endeavours, by convincing arguments, to make pro for his project. When he has won over the weighty pe society, and when, by promise and intrigue, he has also su in getting the interest of the ladies, he proceeds, with sideration of existing circumstances, to the choice of sub the tableaux. After much care and trouble the difficul at last finished, and now it remains to secure the co-ope those who shall act in these tableaux. The gentlemen erally quick to decide; they either consent or they give i reasons for their refusal. The ladies, however, think it i upon them to be coy, and only agree with apparent ind but concealed pride, to take the offered rôle, after ha posed three or four of their so-called "friends," "w surely, be much more suitable for it."

A marvellous activity is now exhibited. Tailor and s bookbinder and house-painter, carpenter and glazier, out of the hotel, and in all the rooms diligent hand observed, which, now with needle, now with the glue-po paring "great things." There is a hammering and sawing and filing, such as the quiet house has seld known. The non-workers wisely shake the head when meaning of all this, and, with pride, they give the answ are the preparations for 'our' Tableaux Vivants."

Hand in hand with these go private theatricals, generally performed on a small stage belonging to the of the hotel. The costumes occasion but little trouble in such cases, whereas the other preparations claim much care and attention. Then numerous "reading rehearsals" must be given, long parts learned by heart, difficult attitudes studied, and all the hints and suggestions of the manager attended to, lest the illusion should lose its effect on the audience. Before all, a careful and serious study of the embraces and the theatrical kiss is necessary, otherwise distortions of the face and limbs might occur which would horrify the spectators. Little by little, however, the performers accustom themselves to the strange situation; and, towards the end, the inevitable "love declaration" flows as fluently from the lips of the suitor as if it came direct from his heart. Should, then, on the evening of the representation, the "lamp-fever," which attacks all beginners, be happily overcome, and the performers have regained their necessary composure, the little piece is played so well to the end, that it richly deserves the acclamation of the audience. The spectators leave the hall fully satisfied, each willingly placing a contribution on the plate which is handed to him by a gentleman of the company, and on the following day a comparatively large sum is given to the president of the society for the "Anonymous Support of Indigent Consumptives."*

It is not only at such times, however, that the benevolence of the Davos visitors is proved, but on other occasions it manifests itself in a striking manner. I mean the annual bazaars which are held in the public rooms of the hotels, Kurhaus, and Belvedere, and whose proceeds are always destined for charitable objects. Numbers of stalls, which have been elegantly decorated with coloured ribbons and evergreens, then attract attention by their varied stores. Speaking heads, gipsies, Chinese, exhibit their skill. Flower girls and orange sellers refresh the visitors with their wares, and lucky bags and bran tubs invite many to dive into their fathomless depths. Here a gentleman trails behind him a richly-embroidered table cover, which he has just won in a lottery; there, a handsome work-bag is offered for purchase; and

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* The object of this society is the support of indigent consumptives, who, during three months, have lived in Davos at their own expense. The necessary money is obtained by collections made in the hotels, by the interest from the Reserve Fund, by the members' subscriptions, by donations, receipts from private theatricals, and musical performances, etc.

A great blessing rests on the philanthropic efforts of the society, and it is in one corner of the room the history of a suicide is illustrated b pictures showing the sad career and end of the Tailor Snip, " wh lately put an end to his life by impaling himself on the point leg of a chair." In this cabinet of curiosities a friendly gentlema in a green coat and yellow inexpressibles, explains his " ante luvian novelties"; and in immediate vicinity the quack doct Faustus, a true friend to suffering mankind, has pitched his te But, without doubt, the greatest excitement is to be found at t

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earnestly to be desired that, laying aside petty differences, all would unite in ing it in its benevolent work.

A survey of the operations during the years 1874 to 1879, which is taken fro little pamphlet published in 1879, may here be given :—

Year.	Members' Subs.	Donations.	Sunday Collections	Miscellaneous Receipts.	Interest.	Reserve Fund.	Number of applications.	Number of those supported.	Nationalities.
1874-75	Frcs. 1120	Frcs. 1720	Frcs. 1420	Frcs. 690 Concert& Theatre	Frcs. 200	Frcs. 3900	8	8	6 Germ. 1 Swiss 1 Dutch
1875-76	40	115	2130	22	314	1360	10	10	9 Germ. 1 Swiss
1876-77	130	250	2820	...	325	* 2150	9	9	7 Germ. 2 Swiss
1877-78	530	340	2880	47	† 173	1520	8	8	8 Germ.
1878-79	140	280	3580	560 Concert	480	2030	12	12	9 Germ. 2 Dutch 1 Eng.

* Frcs. 750, in hand from the preceding year (1877 to 1878), are inclu

† The decrease of interest was occasioned by the purchase of Obli for Frcs. 10,000, in the middle of the year.

The largest sum given to one person was Frcs. 550, the lowest, In all, forty persons have been assisted since March, 1874, and in de person was assisted four times, six persons three times, nine person and the others once. The year is reckoned from April 1st to Ma The last row contains the sums received and paid out from April 1st January 10th, 1879. The reserve fund amounted on January 10th, Frcs. 12,560.

On March 31st, 1879, the Reserve Fund contained Frcs 13,400, and on 1880, Frcs 14,135. From April 1st, 1878, to March 31st, 1879, 16 persons April 1st, 1879, to March 31st, 1880, 21 persons were supported.

refreshment stall, where charming representatives of the gentle sex do the honours in a most graceful manner. Ever new temptations are carried about by the pseudo waiters and cooks, and scarcely do the plates of delicacies appear, than eager purchasers are ready to despoil them of their contents.

Talking and laughing, clinking and singing, rattling and chattering, and innumerable other sounds unite in forming a discord, in comparison with which a "cats' concert" would be sweet music. At intervals the band plays waltzes and polkas, while drums, penny whistles, rattles, Jews'-harps, and other musical instruments accompany it in a very fitting manner. Everyone takes part in the universal rejoicing, everyone gives himself up to the general excitement, and only too unwillingly, do the company leave the gaily-decorated rooms at the end of the proceedings.

With this description I will close my brief account of Davos life.

I hope to have shown that the place is not so poor in amusements, and even in original ones, as many in England might believe.

Those in health need not fear to suffer from *ennui* there, and the invalid will find the change of scene, which is absolutely necessary to his state of health.

APPENDIX.

DAVOS STREET REGULATIONS DURING THE WINTE WITH PRINCIPAL REGARD TO THOSE PARTS O THE HIGH ROAD BETWEEN DAVOS KULM AN DAVOS GLARIS, WHICH ARE MOST FREQUENTE

INTRODUCTION.

FREQUENT complaints having been made by foot passengers, as well as drivers of carriages, concerning the entire absence of any observance of on meeting and passing on the high-road, the Kreis-gericht Davos, has dr up the following regulations in order to remedy this annoyance as fa possible, and has resolved to make them public by having them read in churches on Sunday, December 21st, and by insertion in the *Da Blaetter.*

1.—When Sledges meet Foot Passengers :—

(*a*) If loaded, they must be driven at a walking pace, and mu turned aside as near to the edge of the road as possible, without d of sinking down.

(*b*) If not loaded, and drawn by only one horse, they may be at a slow trot, but the horse must be guided to the edge of the r

(*c*) If not loaded, and drawn by two or more horses, they m driven at a walking pace, and, if possible, turned aside far eno allow Foot Passengers to stand, without danger, on the other the road.

2.—Foot Passengers must turn to the right hand on meeting Sled the left hand if the Sledge comes behind them.

3.—Toboggining on and across the high-road, and in Davos-platz, bidden. Tobogginers on the side-roads must either turn out of the stop entirely on meeting Foot Passengers.

4.—Every Sledge must be provided with bells which can be d heard.

5.—In all other cases reference must be made to the Canton Regulations, principally in those concerning felling trees near the or more Sledges being driven by one man, and leaving Sledges on road.

6.—These Regulations shall be nailed up near the high-road in C Kulm, so that outsiders may become acquainted with them.

7.—A fine of from Two to Ten Francs must be paid for every ment of these Rules, damages not included. Rule 2 only is exc fine then only being enforced if disputes are caused by the turning to the wrong side.

By Order of the Magistrate,

P. ENGI, Se

Davos, December 15th, 1879.

RESIDENCE AND HOURS FOR CONSULTATIONS OF THE DAVOS PHYSICIANS.

Dr. Beeli, on the way to Frauenkirch	between 11 and 1 o'clock (Sundays excepted).
Dr. Boner, near the Catholic Church	between 2 and 4 o'clock.
Dr. Peters, in House Wurth	,, 11 ,, 12 ,,
Dr. Ruedi, in House Taverna	,, 11.30 ,, 12.30 ,,
Dr. Spengler, opposite House Taverna	,, 11 ,, 1 ,,
,, in the Curhaus	,, 10 ,, 11 ,,
Dr. Ten Cate Hoedemaker, House Beeck ...	,, 10 ,, 11 ,,
,, ,, ,, ...	,, 11 ,, 12 ,,
Dr. Unger, opposite Hotel Schweizerhof... ...	,, 11 ,, 1 ,,
,, ,, ,, ...	,, 3 ,, 4 ,,
Dr. Volland, Curhaus, Davos Doerfli	,, 11 ,, 1 ,,
,, ,, ,, ...	,, 2 ,, 3 ,,

HOURS DURING WHICH THE POST AND TELEGRAPH OFFICES ARE OPEN.

THE POST OFFICE IS OPEN:

Sundays	from 8 to 10 a.m. and 4 to 6 p.m.
Weekdays	,, 6 to 7 a.m. and 8 to 12 a.m.
,, ...	,, 2 to 6 p.m. and 8 to 8.30 p.m.

THE TELEGRAPH OFFICE IS OPEN:

Sundays and Weekdays ... ... from 7 a.m. to 9 p.m.

Physical Aspects.

THE
METEOROLOGICAL CONDITIONS
OF DAVOS,

WITH SPECIAL REGARD TO THE QUESTION OF
ATMOSPHERIC MOISTURE,

BY

W. STEFFEN,
OBSERVER AT THE SWISS METEOROLOGICAL
STATION IN DAVOS PLATZ.

[*Translated from the German by* W. H. VORMANN.]

INTRODUCTION.

Davos Platz (Canton Graubuenden, Switzerland), a village which has for many years been known as a winter and summer resort for consumptives, is situated in the elevated Alpine valley of Davos, lying N.E.-S.W., and 1,562 metres (5125 feet) above the level of the sea. This height was found by barometric measurements, taken on the high-road, in front of the Post Office.[*]

All details of medical and local interest are given in the first and last chapters of this book, and in several other works.[†]

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[*] According to the latest official measurements made at the order of the Bundesrath, by the Swiss Geodetic Commission, the top of the mercury column of the barometer in use at the Davos Meteorological Station is 1,560·48 metres (5,119·78 feet), and the pavement in front of the same—south corner of the old chemist's shop—1,556.06 metres (5,105.28 feet) above the average height of the sea at Marseilles. The fixed point valid for Davos Platz is cut on the south side of the above-mentioned house.—W. Steffen, *Davoser Blaetter*, vol. ix., No. 39.

[†] A. Spengler, Curarzt, *Die Landschaft Davos.*
Dr. Reimer, Sanitaetsrath, *Klimatische Wintercurorte.*
G. Ramann, *Davos in seiner Eigenschaft als Klimatischer Sommer-und Wintercurort.*
Waters, *Klimatol, Notizen ueber den Winter im Hochgebirge.*
Dr. Werber, Hofrath, *Klimat, Kurorte der Schweiz;* and others.

PREFACE.

IN publishing this little treatise five years ago, the aim I had
to assist in correcting the many great errors which exist in t
people in general, and even of several physicians, concerning t
employment of meteorological data as far as they affect c
questions. At that time I laid the principal weight on the Ta
was only intended, according to my own wish and that of t
(Hugo Richter), to be considered as an explanatory suppleme
after the publication, I received repeated requests from me
England, who took an interest in the physical aspects of the Dav
make my work also accessible in England. Encouraged by this
animated by the numerous, and at times even flattering, reco
which I was honoured by Scholars and Scientific Journals, I
sented, when the Editor of this book (W. H. Vormann), as
authorization to make the English translation, and to publish
tion with two other treatises on the local and medical aspects
Although the entire work has been revised for the present edi
reader will find in it but little alteration, the only important
being the addition of a chapter containing "Climatological
the omission of the detailed meteorological Tables. I was
latter on account of the great space which these tables wou
have occupied; but I hope that the Annual Surveys, inserted i
will present at least a sufficient substitute. Those, however,
fully satisfied with them, can obtain the whole tables by applyin
Library, where a great many copies have been deposited
Radiation Table of Francis Redford, F.R.S.E., etc., has been
the results of my own observations during the last two years.

Davos Platz Meteorological Station, September 15th, 1881.

W.

II.—PHYSICAL ASPECTS.

THERMOMETRICAL PHENOMENA.

THE mean annual temperature in 1874 amounted to 2·13° Cls. (35·83° Fahr.), and in 1876 to 3·19° Cls. (37·74° Fahr.), numbers which stamp the climate of Davos as a rather cold one, and which must partly be attributed to its high elevation. Very low temperatures may in this place be observed. A. W. Waters, for example, noted, on December 24th, 1870, at 9 o'clock in the morning, −29·5° Cls. (−21·10° Fahr.), and on the same day at 1.30 p.m., −22·9° Cls. (−9·22° Fahr.) Dr. Schimpff, a previous observer, found, on February 11th, 1874, a minimum temperature of −29·3° Cls. (−20·74° Fahr.); and in 1876, a year which had, on the whole, a mild winter, the writer noted on the 5th January, a minimum of −23·5° Cls. (−10·30° Fahr.)

On the other hand, the maximum temperatures were, on the 3rd and 4th of July, 1874, 24·3° Cls. (75·74° Fahr.), ascertained by Dr. Schimpff, and on the 14th August, 1876, 26·2° Cls. (79·16° Fahr.), observed by the writer. Unfortunately, the observations at the official Meteorological Station were, in 1875, once more interrupted by the absence of the observer, so that we possess only the Tables of the year 1874, and it is, therefore, impossible for us to make further statements. Several reasons may be given in explanation of the above-mentioned low temperatures Firstly, as we have already said, the elevation is of great impor tance, but, in the second place, great influence must also b ascribed to the nightly radiation, by which the earth parts wit the heat received during the day from the sun. Especially i winter, the bright nights and the clear sky are very favourab to this process; and principally in them is to be found the cau of such great variations in the thermometric means. Besid this, also, the height of Davos is slightly conducive to the rad tion; the diminished pressure of a shorter column of air bei here of effect. According to Pouillet, the atmosphere ha height of twelve geographical miles, and, if the 5,000 feet dense air which lie below Davos be subtracted, the radiat must of course be essentially favoured. Not only, however this case is the great distance of our place of observation f the centre of the earth of importance, but also in another its influence makes itself felt. Recent measurements have sh in what degree the heat propagates itself from the interior o earth to the surface, and, although the results found are no quite exact, still we may adopt the numbers. More warm radiated from a blackened surface after sunset than is rece O. Froehlich ascertained on the 23rd of October, 1877, with thermo-multiplier, the temperature of space to be —123° (—189·4° Fahr.); the mean temperature of the atmosphere, Cls. (—32·8° Fahr.); while the mean temperature of the ai the earth's surface was 5·5° Cls. (41·9° Fahr.) Now, we surface of our earth (these numbers being assumed) covere a coating of lamp-black, and did it receive no warmth fro interior, the thermometer would show —57° Cls. (—70·6° Even should these numbers change, the fact that the in upon the surface, of the heat existing in the interior of the plays an important part, has been proved by observation in the sea and in shafts. So it is evident that a place lyi greater distance from the earth's centre—and, therefor elevated—must, in general, have a lower soil-temperatu another in a less elevated position.

If we consider the low temperatures which have been enced in Davos, it must surprise us to read in various pa and newspapers that invalids can sit out-of-doors during t without having a sensation of chill, and without experiencing a loss of heat proportionate to the coldness of the air.

We have given an explanation of this interesting fact in our articles, "Temperaturverhaeltnisse des Davoser Winters" (Davoser Blaetter, 1877, Nos. 7, 8, and 11*), and to the present day we hold the opinions which we then maintained. We there pointed out the great dryness of the air as being the chief reason of this remarkable circumstance; and we quoted as an example, that, in Davos during low temperatures we feel the cold less than on the Lake of Geneva; that, for instance, a temperature of 5° Cls, (41° Fahr.) on the Lake of Geneva causes a greater sensation of cold than of —5° Cls. (23° Fahr.) in Davos. (In Section V. of this treatise we have clearly proved that, for equal volumes, the actual amount of moisture contained in the air of Davos is less than that contained in the air of Montreux.) The explanation of this fact is frequently given in a very intricate manner, although it may be briefly conveyed in a very simple way. Good conductors of heat feel warmer to the touch during a high temperature, and colder during a low one, than bad conductors, because, in the first case, they give off the heat more rapidly, and, in the second, they convey it away more rapidly. Damp air conducts heat better than dry air, liquids being better conductors than gases.

"Where do we feel the cold most during low temperatures, in damp air?" we might ask lovers of complicated explanations. The answer would undoubtedly be, in the parts of the body left uncovered, as, for example, the hands. (The influence on the covered parts of the human body are not here taken into consideration.) Let us, for instance, take a blanket and a piece of stone lying in a room which has a temperature of 15° Cls. (59° Fahr.), and convince ourselves with the thermometer that both have the same temperature. If, now, we lay one hand on the blanket and the other on the stone, we shall find that the stone feels cold, the blanket warm; the palm of the hand which lay on the piece of stone has perceptibly and demonstrably lost heat, while the hand which lay on the blanket has experienced but little change. The stone and the blanket act, to a certain degree, in the same way as damp and dry air.

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[*] Some translated extracts from these articles are inserted by the author's permission as foot-notes in the following pages.—EDITOR.

To take another example, let us enter a dry, well-aired ante-room of a bath-house in Baden-Baden, having a temperature o 25° Cls. (77° Fahr.) We undress ourselves, and find the roo still very warm. Entering then, under like circumstances, bath-room of the same temperature, but filled with damp air, i consequence of warm douches which have been previously give here, we shall find it very close. Lastly, a bath filled with wate at 25° Cls. (77° Fahr.) will feel still warmer. This exampl clearly proves that the increase of conducting power which take place in passing from air to water is very perceptible. Our n feeling the cold in this case is easily explained as follows :—Th difference between the temperature of air, vapour, and water, o the one hand, and of the human body on the other, being smal the process of breathing can readily replace the amount of he irradiated, viz.: the difference between 25° Cls. (77° Fahr.) an 37° Cls. (98° Fahr.)

Moreover, we may readily observe that the air on rivers fee much warmer than air of an equal temperature on land— effect principally produced by its greater dampness. A wa taken on a warm day in July or August, between 12 and 1 o'cloc over the bridge of boats at Mayence, for instance, will show that the influence of warm aqueous vapours makes itself felt the form of great sultriness.

Let us now return to our former example, and reverse the ca diminishing the temperature of the rooms from 25° Cls. (Fahr.) to 10° Cls. (50° Fahr.), so that the difference between t temperature of our body and that of the surrounding air is (48°), and not 12° (21°). In the ante-room we shall n feel very cold without our clothes, in the bath-room we sh feel still colder, and in the bath of 10° Cls. (50° Fahr.) shall have a strong sensation of chill, the process of brea ing not being able in this case to compensate sufficiently for warmth conveyed away from the body by the water, etc. has not yet been accurately proved by experiments in w proportion this process compensates' for the warmth conve away by the surrounding damp air. Although we can, th fore, give no exact statistics, still, we may affirm that an temperature of about 15° Cls. (59° Fahr.) produces, un ordinary circumstances, a sensation of neither cold nor war whilst the temperatures of 20° Cls. (68° Fahr.) and above, give in air completely saturated with moisture, a feeling of warmth, and the temperatures of 10° Cls. (50° Fahr.) and lower, produce a cold, damp feeling.

Another powerful auxiliary, viz., the solar radiation, favours sitting out of doors, that is to say, prevents, to a certain degree, our being made sensible of the low temperature of the air which in fact prevails.

This exerts its influence in a very beneficial manner, and no natural philosopher would concede it to be really possible to sit in the open air in Davos with the thermometer standing many degrees below freezing-point, were it not for the warmth produced by this powerful agent. A few examples will give an idea of its importance in connection with the subject in hand.

On Feb. 26th, 1871, A. W. Waters observed with a Maximum Black-bulb Thermometer in vacuo, 52·2° Cls. (125·96° Fahr.), while the maximum temperature of the air had been 6·7° Cls. (44·10° Fahr.). Whereas our friend, the Rev. F. Redford, M.A., F.R.S.E., found on October 5th, 1876, 64·2° Cls. (147·0° Fahr.), while the maximum temperature of the air in shade was 23·9° Cls. (75·0° Fahr.); on Feb. 15th, 1877, 64·0° Cls. (147·2° Fahr.), maximum temperature in shade, 8·4° Cls. (47·2° Fahr.); on March, 25th, 1877, 72·7° Cls. (162·8° Fahr.), maximum temperature in shade, 5·6° Cls. (42·0° Fahr.).

In the appended Tables, containing the investigations made by the Rev. F. Redford from Sept., 1876, to April, 1877, and by the writer of this treatise, in the years 1879 and 1880, further details are given. The question naturally now arises, "Why does the direct influence of the solar rays produce so powerful an effect?"

The following conditions undoubtedly give the answer:—

1. The 5000 feet of densest atmosphere which lie below Davos have not to be pierced by the sun's rays, and therefore cannot absorb any heat.*

2. The air of Davos is but little saturated with water, and thus the absorption of heat is lessened.

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* "It has long been a recognised fact that the sun's rays are of greater power in elevated places than in low ones. As during their passage through the atmosphere a considerable number of rays become absorbed, this absorption must of course be greater, the longer the distance, and the denser the strata through which they travel. According to Penllict, these rays falling vertically lose during their passage a fourth or a third of their intensity, supposing that the weather is completely serene. The fact that Davos lies 5000 feet above the sea is therefore of the greatest importance."—W. STEFFEN, "Davoser Blaetter," Vol. VI., No. 7.

3. The frequent calm which prevails in winter also diminishes to a certain extent the absorption of the solar rays, which is ir windy weather, undoubtedly greater.*

4. The solar rays are, on all sides, reflected by the snow whicl covers the ground,† thus warming the under-layers of air mor thoroughly, in that they traverse them several times. A cons quence of this is that they are absorbed in a greater degree b our clothes.‡

In order to show in what degree the real reflection of he affects the temperature of the lower strata of the air, we w give the following example:—The temperature of the surface the snow amounted at 4 p.m. to —13·7° Cls. (7·30° Fahr.), wh on the contrary, the temperature of the air, ascertained a height of two metres (6·6ft.) above the snow, was —9·1° ((15·60° Fahr.) The surface of the snow was thus 4·6° (8 colder than the air, the cause being unquestionably the reflect It will, of course, be understood that all necessary precaut were observed in taking these measurements, as, for insta the protection of the bulb of the thermometer from direct s radiation, etc.

To this reflection principally is also due the fact that the s in spite of the strong influence of the sun's rays, remains d

In order to explain and prove to the visitors in Davo influence of the sun's rays on the clothes, we made durin winter 1876–77 the following experiment:—

We enveloped a normal thermometer with a piece of f (to represent a vest), a piece of linen (to represent a sh waistcoat, and a coat. We chose for the latter a grey col which black and white were pretty equalled distribute which, consequently, answered to the mean absorption of heat. In this manner we believed that we had represented, as nearly as possible, the ordinary dress of a Davos patient.

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* "Like the rays of light, so the rays of heat produce a less intense they pass through an agitated medium than through a still one. The b vapour suspended in the atmosphere, the air itself being but little absorb fewer rays of heat than in the contrary case. The solar radiation fore greater; but the evaporation taking place from the surface of th body, caused by air in motion, and the abstraction of heat consequent however, less."—W. STEFFEN, "Davoser Blaetter," Vol. VI., No. 7.

† "The snow which lies on the surrounding mountains exercises warming effect. and the white slopes on which the sun shines, thr reflection, a great number of rays of heat into the valley."—W. "Davoser Blaetter," Vol. VI., No 7.

‡ In No. 7 of the "Davoser Blaetter" is given as fifth condition, alt of great influence, the geographical position of the place. (Long. fro 30m., Lat. 46deg. 48m.)—EDITOR.

The thermometer thus prepared we set on the south-west balcony of our house, exposing it to the direct rays of the sun. The results were the following :—

DATE.	Temperature of the air in Shade.		Temperature of the clothed thermom. in Sun		Direction and force of Wind.	Amount of Cloud.
	Cls.	Fahr.	Cls.	Fahr.		
Jan. 25th, 1877	Degs.	Degs.	Degs.	Degs.		
10½ o'clock	— 3·4	26·1	6·2	43·2	NE 1	8
11 ,,	— 2·2	28·0	9·8	49·6		8
11½ ,,	— 1·7	28·9	11·5	52·7		7
12 ,,	— 1·7	28·9	8·6	47·5		9
1 ,,	— 1·7	28·9	4·7	40·5		9
Jan. 27th, 1877						
10½ o'clock	— 9·3	15·3	23·5	47·3	NE 0·5	1
11 ,,	— 11·6	11·1	26·6	79·9		
11½ ,,	— 10·0	14·0	29·4	84·9		
12 ,,	— 8·3	17·1	32·3	90·1		
12½ ,,	— 6·7	19·9	35·0	95·0		
1 ,,	— 6·4	20·5	37·7	99·9		
1½ ,,	— 7·9	17·8	37·4	99·3		
2 ,,	— 7·4	18·7	36·5	97·7		
3 ,,	— 8·5	16·7	30·2	86·4		
3½ ,,	— 9·5	14·9	15·0	59·0		
Jan. 28th, 1877						
1 o'clock	0·7	33·3	38·2	100.8	NE 0·5	1
1½ ,,	0·0	32·0	41·1	106·0		
2 ,,	0·7	33·3	42·4	108·3		

These numbers have, of course, only an approximate value, because in the case of the human body other modifying conditions must still be taken into consideration.

On January 25th, as our Table points out, the clothed ther-

mometer had received very little warmth, and, in fa
day invalids could *not* sit in the open air without d
without experiencing a chilly sensation. The tempe
the contrary, which were conveyed to the same inst
the direct solar rays on the 27th and 28th days of Ja
a great deal higher, and thus we can comprehend tha
days one could very well sit out of doors in spite
temperature of the air. On the 27th namely, the o
the sun's rays on the clothes produced a temperature
(98° Fahr.), and on the 28th one of 42° Cls. (108° F
normal temperature of the human body is, in roun
37° Cls. (98° Fahr.) If, however, we sat in a clos
42.4° Cls. (108·3° Fahr.) we should find it insupportab
in the open air the surrounding cold air effects a contin
that is to say, a decrease of temperature (augmented p
not being taken into consideration).

On January 28th the temperature of the air wa
(33·3° Fahr.), that of the clothed thermometer 42·4°
Fahr.); in this case the temperature of the air, sup
the principal corrections were made, and that it was n
a distance of 10 millimètres (·394 inch) from the clothes
according to the calculation, to 21·6° Cls. (70·9° Fahr.
which indeed stands very near to 22·1° Cls. (71·8° F
was found by measurement. In a spot sheltered
draught, the air immediately surrounding us sho
quoted temperature on the average, 21·6° Cls. (70·9°
a room this temperature would feel unpleasantly hot,
several persons who happened to be in the proxim
apparatus during the investigations, felt it so, a pro
results of my observations and calculations appro
near the reality. In conclusion, some words may
answer to the question which so often arises, as to wh
become unpleasantly warm during the summer in
glance at our Tables will show that, on July 23rd an
25° Cls. (77° Fahr.), and on August 14th of the
26·2° Cls. (79·2° Fahr.) were registered.

Such heat is, however, easily borne in this place,
motion of the atmosphere is in proportion greater
than in winter, and is, especially in July according t
vations, very lively. A continual compensation

between the warm and cold strata of air in the higher regions, and this undoubtedly causes a constant circulation of the air. The condensations of vapour also, which take place in the upper and lower aerial layers, manifest themselves in it.

In any case, the change of temperature will be found to be very agreeable if one comes to Davos from the lowlands during the hottest part of the summer.

FALLS OF RAIN AND SNOW.

UP to the present day it is supposed, on the grou experience, that the falls of rain are less in regions than in lower ones. A more or less eff reason for this may be found in the fact that the general perature of the air is lower, and that in consequence less can be absorbed. Further, experience in general teaches the great falls of rain do not occur at the same time in th lands and in the high mountains, otherwise the devas inundations would be considerably increased in number. instance, the wind brings aqueous vapours from the ocea Germany to the Alps, these vapours are either condensed at the foot of the Alps—in which case, in the high mou but little rain is to be expected—or else the condensation place, as often happens in late summer and autumn, in t temperature of the higher mountain regions, and then lowlands the minimum of rain will be observed.

As proof of this some examples may be taken from the which the Director of the Meteorological Central Stat Zurich, R. Billwiller, has drawn up; important factors instance geological formations, etc., must, of course, unnoticed.

In the time from June 10th to June 12th, 1876, inclusi quantity of rain in millimetres (inches) found by measur with the rain gauge, amounted in—

Winterthur......	441	metres	(1446ft.)	high,to	305	millimetres	(
Zurich............	470	,,	(1542ft.)	,, ,,	272	,,	(
Friedrichshafen	407	,,	(1334ft.)	,, ,,	179	,,	(
Ragatz............	541	,,	(1774ft.)	,, ,,	115	,,	(
Engelberg......	1024	,,	(3360ft.)	,, ,,	90	,,	(
Davos	1562	,,	(5125ft.)	,, ,,	59	,,	(
St. Moritz......	1832	,,	(6012ft.)	,, ,,	32	,,	(
St. Gallen......	660	,,	(2165ft.)	,, ,,	314	,,	(

The last-mentioned town is undoubtedly an exception, because other powerful influences, such as those above quoted, are brought to bear.

In June, 1876, the rain-fall amounted in

Winterthur.........	to 439	millimetres	(17·3 inches.)
Zurich...............	,, 430	,,	(16·9 ,,)
Friedrichshafen...	,, 285	,,	(11·2 ,,)
Ragatz..............	,, 278	,,	(10·9 ,,)
Davos	,, 116	,,	(4·6 ,,)

In 1876 the total fall during 159 days amounted in Davos to $1052.6^{\text{m.m.}}$ (41·5 inches), while the snow which fell during 43 days had a height of $767^{\text{c.c.}}$ (302·2 inches). The height was measured after every fall of snow.*

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* Interesting statistics, which were given by W. Steffen in the "Davoser Blaetter," Vol. VI., No. 11, may here be quoted:—

TEMPERATURE MEANS AND TOTAL RAIN (SNOW) FALL IN DAVOS, FROM 1874-1877 INCLUSIVE, DURING THE MONTHS OF

	TEMPERATURE.								Total Rain (Snow) Fall.	
	7 o'clock a.m.		1 o'clock p.m.		9 o'clock p.m.		Reduced Monthly Mean.			
	Cls.	Fahr.	Cls.	Fahr.	Cls.	Fahr.	Cls.	Fahr.	Millimetres.	Inches
JAN.	Degs.	Degs.	Degs.	Degs.	Degs.	Degs.	Degs.	Degs.		
1874	—9·08	15·66	—3·14	26·35	—8·26	17·13	—7·05	19·31	77·50	2·27
1875	—7·94	17·71	—1·08	30·06	—6·10	21·02	—5·2	22·64	77·00	3·03
1876	—9·58	14·76	—1·30	29·66	—8·94	15·91	—6·80	19·76	118·80	4·68
1877	—5·92	21·34	—0·33	31·41	—5·78	21·60	—4·01	24·78	58·02	2·29
FEB.										
1874	—11·14	11·95	—3·48	25·74	—9·02	15·76	—8·09	17·44	22·00	0·87
1875	—9·76	14·43	—3·59	25·54	—10·05	13·91	—7·80	17·96	28·90	1·14
1876	—7·44	18·61	0·29	32·52	—6·17	20·89	—4·44	24·01	151·80	5·98
1877	—5·70	21·74	—0·23	31·58	—4·84	23·29	—3·59	25·54	157·40	6·20

ATMOSPHERIC PRESSURE.

The oscillation of the barometer varied in

1876	between	609·0	millimetres	(23·995	inches)	and	643·5	millimetres	(25·354 in
1877	"	612·9	"	(24·148	")	"	642·3	"	(25·228
1878	"	611·4	"	(24·089	")	"	643·1	"	(25·338
1879	"	608·3	"	(23·967	")	"	645·5	"	(25·433

It is scarcely necessary to mention that we have in ger during the warm season higher, and during the cold se lower, barometrical readings; the true mean, however (so n is certain), lies close to 630 millimetres (24·822 inches).

All investigations which were formerly made with the b meter of our Station gave the numbers too low; a correctio the former Tables will, however, not be possible until we pos the barometric means for the next few years. Then, of co the calculations of the height will also have to be modi although the numbers which are given for the present, $630^{\text{mm.}}$ (24·822 inches) for the barometric reading, and metres (5125 feet)* for the elevation, are not far from the res

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* Or 1556 metres (5105 feet); vide Introduction.

THE FOEHN.

A FEW words may also be dedicated to the well-known Foehn, a wind concerning the nature of which the opinions of the learned have for a long time differed. Now, however, through the varied and fruitful studies of Messrs. Weilenmann and Billwiller, the question has been settled.* R. Billwiller started, among others, the theory that the Foehn originates *when the disturbed equilibrium of the atmosphere is re-established by currents descending from the upper regions.*

The Alps hinder the compensation of the differences of pressure in the lower layers of the atmosphere, so that it can only begin in the lowest parts of the Alpine Ridge, namely, in the Passes.

The air flows down from them with impetuosity into the valleys, warming itself quickly on the way, and becoming comparatively dry; in a word, it receives the qualities which are characteristic of the Foehn. This wind is to be considered as an exclusively local phenomenon, and it is clear from the above remarks that it must occur with the greatest intensity in the deepest and narrowest mountain valleys which are found in the lowest parts of the Alpine Ridge, a conclusion which fully harmonizes with the observations made. Some data from the Foehn-period of the month of January, 1877, may here be quoted, the numbers under T giving the temperature of the air, those under F the relative humidity in percentages.

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* Weilenmann: "Stuerme;" Billwiller: "Vierteljahrsschrift der Zuercher Naturforsch, Gesellsch, 1876."

ON JANUARY 4TH, 1877.

Places.	7 o'clock, a.m.			1 o'clock, p.m.			9 o'clock, p.	
	T.		F.	T.		F.	T.	
	Cls.	Fahr.		Cls.	Fahr.		Cls.	Fahr.
	Degs.	Degs.		Degs.	Degs.		Degs.	Degs.
Bâle	4·4	39·92	75 p.c.	7·5	45·50	68 p.c.	6·6	43·88
Zurich	1·6	34·88	89 ,,	6·4	43·52	67 ,,	5·0	41·00
Glarus	15·6	60·08	22 ,,	15·3	59·54	33 ,,	15·6	60·08
Auen	11·6	52·88	26 ,,	11·6	52·88	41 ,,	8·8	47·84
Altstaetten	13·8	56·84	18 ,,	14·2	57·56	27 ,,	14·8	58·64
Altorf	13·0	55·40	26 ,,	14·2	57·56	30 ,,	13·8	56·84
Davos	0·5	32·90	52 ,,	7·0	44·60	44 ,,	3·5	38·30

Very high temperatures up to 17° Cls. (62·6° Fahr.) were caused by the Foehn on January 9th in Glarus, etc., whilst had during this day only 11° Cls. (51·8° Fahr.), and Davos 7° (44·6° Fahr.)

A violent aerial current descending from the Alpine R prevailed with short interruptions up to the 10th of Janua general in all these low stations, caused, as the Synoptic Ch show, by the barometric area of low pressure coming from Atlantic Ocean, the influence of which is very widely exten

If we remark that during the whole of this time the temp tures in Upper Italy as far as Rome were very moderate, a 4°—8° Cls. (39°—46° Fahr.), and that during the whole morning temperatures from 15°—16° Cls. (59°—61° Fahr.), suc we found in Glarus on January 4th, were never observed in whole of Italy and even in Sicily, nobody will find in this fac argument favourable to the so-called Sahara-theory of the Fo More than this, meteorologists can scarcely expect at pres after having so often experienced the difficulty of enlighte even educated men on the falsity of this theory, the conclus of which are indeed apparently as convincing as they are sim

We will only briefly repeat that the opinion that the Foeh merely an aerial current coming over the Alps from the Sah and receiving its warmth and relative dryness through the influence of this desert, is now completely exploded.

All Foehn-storms are parts of cyclones, and do not receive their extraordinary warmth before they reach the northern declivity of the Alps. The damp, south air which they—as parts of cyclones—bring with them from the Atlantic Ocean is stopped in its passage at the southern declivity of the Alps, and forced to ascend. In the higher regions it cools down, and the aqueous vapour becomes condensed into clouds or under some circumstances into rain or snow. This condensation setting warmth free, diminishes the cooling. The colder and heavier air from the higher regions is now pressed down at the northern declivity, and exposed to a greater pressure on account of the higher column of air above it. This repeated stoppage, in consequence of which compression arises, produces warmth which soon reaches a high degree. The air which is already of itself moist (with greater *absolute* humidity) can, because of this warming, absorb a great deal more water, and shows therefore a low per-centage of *relative* humidity, that is to say, it feels dry, and produces a desiccating effect.

The important fact here becomes evident, that the Foehn shows but little relative humidity. Apparent contradictions immediately present themselves, and they will still be increased if we add that the peasant greets this wind with joy, because it dries his hay quickly, that people in general, however, are conscious of a feeling of sultriness, because they are surrounded by moist, warm air.

These remarks lead us naturally to a new chapter, to which the greatest part of our treatise will be dedicated.

THE QUESTION OF ATMOSPHERIC MOISTU

THE opinions concerning the conditions of Atmosp
Moisture, particularly with regard to their influenc
physiological processes, have, even in modern ti
occasioned an endless number of errors. Physicians and ot
make assertions on this subject which are pure physical imp
bilities. They take the bare numbers of the per centag
relative humidity given in the Meteorological Tables, and q
them as direct values, thus making classifications which
based on misunderstood meteorological statements. We
only ascribe it to an unfortunate accident that this question s
even to be mistaken by Sanitaetsrath Dr. Reimer, in his e
lent and exhaustive work on Winter Health Resorts, and w
sure that the learned author has either over-looked the s
mistakes, or has not occupied himself personally with
question.

In making use in the following lines of the copious and
fully-recorded meteorological data to be found in the a
mentioned book, we will take the opportunity, availing ours
of the permission given in its preface, of pointing out t
writer some errors which occur in his treatment of the que
of humidity.

Absolute humidity is the quantity of aqueous vapour (abs
amount of vapour) which is suspended in a given volume o

By relative humidity is meant the per centage of aqueous vapour which the air at a given temperature contains of the whole quantity it is capable of containing at that temperature.

We can most readily employ absolute humidity as our standard in judging of a climate with respect to the influence of its air on our body; its statements remaining (for this purpose) everywhere invariable, and the numbers calculated from them permitting correct comparisons, because the final temperature, 37° Cls. (98° Fahr.), which the air receives in the lungs, is also everywhere the same. It is another matter, however, with the per-centages of relative humidity. From these, without reducing them, we can never, in order to make comparisons of climates, draw direct conclusions which will show the physiological influence of the air on our body, the temperatures to which they refer not being the same. The various temperatures at which the per-centages of the relative humidity were measured, are raised everywhere in our body to the even temperature of 37° Cls. (98° Fahr.); the per-centage therefore which the air showed before receiving moisture from the lungs becomes unevenly changed. For the difference between the temperature of the air at any given time and that of the body varies considerably to begin with.

For meteorology, the results which are obtained by ascertaining the percentage of relative humidity are, of course, of the greatest importance. If, for instance, at 15° Cls. (59·0° Fahr.), the Psychrometer (Dry and Wet Bulb Thermometer) shows 99·5 per cent. of relative humidity, the air can only take 0·5 per cent. more of aqueous vapour. It is, therefore, for this temperature, nearly saturated, and dew, rain, or snow will then be very probably deposited. In any case this deposition must occur as soon as any considerable cooling of the air takes place, by which the point of saturation falls; and the excess of vapour, after the air has reached its maximum of vapour tension, is set free, of course supposing that, at the same time, no motion of the atmosphere brings with it much dry air, which would absorb the excess before it could be condensed. High per centages of relative humidity, it may briefly be repeated, at any temperature whatever, lead us to expect a fall of rain, etc., if the air is cooled. Important as these per centages are for meteorology, still they can never, without being reduced to a fixed temperature, be employed in making comparisons of climates in order to prove in what state of the air most water is abstracted from the human body; for instance, by the process of breathing. We will even go much further, and state that the lower the temperature of a climate is, the less must be the absolute humidity, be the relative humidity what it may. The absolute amount of vapour suspended in the atmosphere increases and diminishes in general with the temperature; it is, therefore, greater in summer than in winter, and at mid-day than shortly before sunrise. The relative humidity, on the contrary, behaves in the exactly opposite way, and a single glance at our meterological chart will clearly point this out. We utterl dissent from the conclusions which not only Dr. Reimer, in hi "Klimatische Wintercurorte,"* but also the authors of some othe pamphlets have drawn, based upon the per-centages of relativ humidity applied, directly and without reduction, and whic depend on the assumption that relative humidity is the objectiv standard for subjective sensations of wetness and drynes and that it produces an effect on animals corresponding to it figures. We can never believe that Muehry, when he says, "Th lower the point of saturation is the more thirsty becomes th climate," ever intended this result to apply to animals or me that is to say, supposing we take the per-centages of relati humidity as standard. If from the data which are given meteorological tables of relative humidity, we draw conclusio concerning the evaporation from the earth's surface and fro plants, the frequency of rain-falls, the drying of meat, the dryi of clothes more or less quickly, and, lastly, the drying of ha then, of course, we may—the motion of air excluded—unquestic ably employ these per-centages, because all these things abo quoted have always the same temperature as the air. Nev however, can the per-centages of relative humidity, as has oft occurred in pamphlets and other larger works, be brought i reference with the sensations or the thirst of men and anim nor with the amount of water lost by breathing and perspiration. The temperature of wet linen accommodates itself, degree by degree, to that of the air (cold of evaporation left out of account), and we may say that this material dries more quickly at 50 per cent. of relative humidity that at 60 per cent., and that, undoubtedly, it could not dry more quickly at 99 per cent.

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* "It is of great importance for physicians and invalids to know thoroug what proportion—to be ascertained by August's Pyschrometer—the amoun vapour *existing* in the air at a certain temperature bears to that *possible* at same temperature (expressed in per-centages of the latter). This proportion, 'relative humidity,' is the objective standard for the subjective sensation of ness and dryness, and indicates to us an effect on plants and animals corresp ing to its figure. To speak with Muehry, the lower the point of saturation more thirsty becomes the climate."—Taken from Dr. Reimer's "Klimati Wintercurorte," page 11.—EDITOR.

But the human body does not accommodate itself to the temperature of the air, remaining always constant to 37° Cls. (98° Fahr.), and therefore cannot be compared with the abovementioned objects. A practical proof may here be given. Let the relative humidity in a climate N. be 83·4 per cent., in a climate M. 70 per cent. Now, an author would unquestionably say in his pamphlet, "The climate N. is 13·4 per cent. moister than that of M.; we shall find in N. a damp air, and we shall even feel it so." It is in print, and it was so at N., so it must of course have been felt! We affirm, on the contrary, that the case is exactly the opposite, and that the air in N. contains a great deal less moisture than that of M. Nobody can have perceived humidity in N., and thirst and perspiration certainly were not less in spite of the extra 13·4 per cent. of relative humidity which the writer had stated. To the human body and to wet linen, it may again be repeated, the same standard cannot be applied, because the temperature of the latter accommodates itself to that of the air, whereas the former is not affected by the great temperature variations, but remains constant at 37° Cls. (98° Fahr.)

It is exactly this confounding of a constant quantity with a variable one, that gives rise to so many errors.

The key to our above assertion is to be found in the fact that the mean temperature of the air in climate N. with 83.4 per cent. relative humidity, is —4·71° Cls. (23·52° Fahr.); the mean temperature of the air in climate M. with only 70 per cent. is × 13·06° Cls. (55·51° Fahr.), while the human body possesses in both climates a temperature of 37° Cls. (98° Fahr.) Now, if we breathe air at any supportable temperature, it will be warmed in our body to 37° Cls. (98° Fahr.) in N. as well as in M., and since the air diffuses itself throughout the whole texture of the lungs we suppose, though not physiologists, that it absorbs moisture until it becomes saturated on reaching the maximum of elastic force for 37° Cls. (98° Fahr). The differences between the elastic force of vapour at the temperature of the air before inhala and that at 37° Cls. (98° Fahr.) show us the absorption of w from the lungs. The air of N., with 83·4 per cent. rela humidity, ascertained at—4·71° Cls. (23·52° Fahr.), had, befo was inhaled, an elastic force of 3·21 mm. (·126 inch), whereas air of M., with 70 per cent. relative humidity, measure 13·06° Cls. (55·51° Fahr.), had an elastic force of 11·23 mm. (inch). The difference between 3·21 mm. (·126 inches) 46·69 mm. (1·840 inches)—force of vapour tension at 37° (98° Fahr.)—is undoubtedly greater than that between 11·23 (·442 inch) and 46·69 mm. (1·840 inches).

Let us pursue the subject further. If we take equal volu of air in N. and M. if we confine them and heat them to 37° (98° Fahr.) so that their original absolute amount of w remains the same, and only the elastic force is altered, finally, if we ascertain the relative humidity of each, we sh find 6·6 per cent in the air N., which formerly had 83·4 per c and 18·2 per cent in the air M., which formerly had 70 per c A result which certainly proves the truth of our prev assertions. In order, however, to make the subject still clea the following may be said.

The air of N., which had, in the beginning, 83·4 per c relative humidity, can still receive, if measured at 37° Cls. Fahr.) 93·4 per cent. in order to attain the point of full saturat because at this temperature it contained only 6·6 per c relative humidity; while the air M., which had in the begin 70 per cent., can, under the same conditions, receive only per cent., because at 37° Cls. (98° Fahr.) it had already 18·2 cent. Again a cubic metre of air saturated at 37° Cls. Fahr.) contains, as is known, 43·5 grammes (735·150 minims water, and as the air of N. held, before it was inhaled, 6·6 cent. or which is the same thing, 2·871 grammes (48·520 mini so it can still receive, and eventually give out, per cubic m (35 cubic ft.) 40·629 grammes (686·630 minims) of water during process of breathing. The air of M. on the other hand contai before inhalation, calculated at a temperature of 37° Cls. Fahr.) 18·2 per cent.=7·92 grammes (133·848 minims) of wa of the 43·5 grammes (735·150 minims) which are required saturate a cubic metre of air (35 cubic feet), so that in M., c 35·58 grammes (601·302 minims) can be given out during process of breathing. It is not possible to make the subject clearer, and every one must learn from our deductions that the comparisons with per centages of relative humidity are, in most cases very deceptive. Air, which in a pamphlet was described as moist because it contains 83·4 per cent. relative humidity, abstracts in fact, if inhaled, per cubic metre (35 cubic feet) 40·629 grammes (686·630 minims) of water from our lungs; while the air showing 70 per cent relative humidity, and described as dry, is able to abstract from us only 35·58 grammes (601·302 minims) of water,

It now still remains to consider the influence of humidity on the loss of water produced by perspiration. If we allow, first, air with a relative humidity of 70 per cent. ascertained at 5·4° Cls. (41·72° Fahr.) to operate on the skin, and suppose that the stratum of air which is nearest the skin receives a temperature corresponding to the mean of air and body—in this case 21° Cls. (69·8° Fahr.)—this air will have an elastic force of 28·6 per cent. of relative humidity. If we next let another air, with a relative humidity of 79 per cent., measured at—1·1° Cls. (30·02° Fahr.) act in the same way on the skin, we shall find near the body a temperature of 18° Cls. (64·4° Fahr.) and this air will have a relative humidity of 23·4 per cent. as compared with the maximum amount of water which is possible at 18° Cls. (64·4° Fahr.) In the second case, therefore, the air which had in the beginning a greater relative humidity, is now 5·2 per cent. drier. The loss of water caused by perspiration should therefore be greater in the relatively moister, but colder climate. Experience, however, does not establish this physical result, for we cannot assume that we perspire more at a lower temperature than at a higher one. Physiology explains this contradiction. Every increase of the temperature of the air which surrounds our body augments the perspiration by expanding the conducting capillaries, while a decrease, as is the case in our example, produces an exactly opposite physiological effect. We see, therefore, that the evaporation of water from the skin must be, for physical reasons, greater in a colder and absolutely drier climate, a fact which may also explain the consequences of perspiration when out of doors.

The body secretes, in a climate with such properties, less moisture, and because this moisture evaporates more quickly

and more intensely, we shall, perhaps, be right in supposin
we find in this the reason why the skin becomes so often dr
chapped at Davos. These considerations only add to the
that a cold climate is absolutely drier than a warm one.
conditions which obtain in Polar Regions may here be ment
The relative humidity must there be great, but the ab
humidity, very low in consequence of the severe cold an
quantity of vapour which is conveyed away by the proc
breathing, will greatly exceed the average. This vapour c
even be absorbed quickly enough by the air, and is conseq
deposited on the air and clothes as ice, in a very disagr
manner, so that the whole apparel is often entirely enc
until it becomes hard and unpliable. In winter, during a
cold, a similar circumstance may be observed on our ho
they have made a long journey through the snow, the
evaporating from the skin gives them the appearance of
covered with hoar-frost.

Let us now revert to the attribute of the Foehn-air whi
mentioned at the conclusion of the foregoing chapter. W
there that this wind, although its air is moist, is welcom
our peasants during hay-harvest because it dries the hay q
This experience, which apparently contradicts the fact th
same air appears sultry to man because it is moist and w
incontestably explained if we state that air containing
aqueous vapour, at an increased temperature, shows a low
centage of relative humidity, and therefore produces a desic
effect; indeed our Foehn Table clearly points this out. T
takes the same temperature as the Foehn-air, and the dryi
cess follows therefore the per-centage of relative humidity.
elastic force of the vapour contained in the already moist
air is increased in the valley, where the air rises to its ma
temperature, by which its capacity for moisture, and conseq
its drying power, is considerably increased. The peasa
the mountains, to which this Foehn-air now rises, would ce
not give such a favourable judgment as their friends in the
The hay there does undoubtedly not dry so quickly; in
quence of the decrease of temperature the elastic force
vapour becomes less, the air is over-saturated, and frequ
fall of rain or snow makes the hay wet.

The principal reason that the Foehn-air appears sul account of its greater amount of absolute humidity, is, that air containing much aqueous vapour conducts heat better than dry air. The temperature of the Foehn-air is a high one, the difference between it and the temperature of the human body is not very great, the process of breathing induces more warmth than the air conveys away, and the decrease of the temperature of the body caused by the evaporation from the skin, is, as is well known, less in an atmosphere heavily laden with moisture than in a dry one, equal temperatures being supposed. The warm, damp air of the Foehn must therefore cause a sensation of sultriness.

Many people will, in spite of this, still continue in the belief that they must feel in such an air a dry heat instead of sultriness. Such a belief, however, caused by want of observation, can only be excused by the tale of the Indian king, who, when an Englishman presented him with a piece of artificially-made ice, even believed that it was very hot, and that it burnt his hand, because he had never before seen anything like it.

We will now consider some further cases in which the moisture of the air plays a great part, still bearing in mind that the bare numbers of relative humidity can never be taken as a standard without being reduced, when we are speaking of bodies which do not accommodate themselves to the temperature of the air. On the other hand, however, we will take care not to confound absolute with relative humidity in reactions which take place at the same air temperatures. The formation of mould, the decomposition of organic substances, and the generation of lower organisms, are facilitated in a warm air which has a high per-centage of relative humidity. The reason why relative humidity manifests itself in such different ways in cold and warm climates, though the per-centage is the same, may be easily explained by the following example, which comes very near to the reality. When the air of a colder climate enters a cellar, its capacity for moisture will not be lowered but rather increased. The air of a warmer climate, however, will be cooled in a cellar and its capacity for moisture proportionately diminished. If, for example in Davos, air, having 75 per cent. relative humidity, ascertained out of doors at a mean temperature of 3·19° Cls. (37·74° Fahr.), enters a cellar which would certainly not have a lower mean temperature than 3·19° Cls. (37·74° Fahr.)

[generally 4° Cls. (39·2° Fahr.)], it will not be cooled; its va
tension, estimated by the per-centage of relative humidity,
not be diminished, and therefore, in this per-centage, not incre
and condensation of the moisture becomes therefore impos
As it retains its 75 per cent. relative humidity, it can still
duce a desiccating effect which agrees with the remainin
per cent.; so that formation of mould, decomposition, etc.
consequently rendered difficult. On the other hand, if,
warmer climate, air with a mean temperature of 10° Cls. (
Fahr.), and containing also 75 per cent. relative humidity, c
into a cellar or other cold place where it is cooled down to
5° Cls. (41·0° Fahr.), the case must, of course, be entirel
opposite. The relative humidity will, through the 5°(9°) of
ing, be raised even above the maximum, that is to say,
complete saturation of 100 per cent. and a deposition of wa
in this case of 6·7 per cent.—must take place.

We have seen that the cooler air which, at a temperat
3·19° Cls. (37·74° Fahr.), had 75 per cent. relative hum
retained in the cellar a drying power of 25 per cent., whi
warmer air with the same humidity, measured, howev
10° Cls. (50·0° Fahr.), lost in the cellar its desiccating q
and was even over-saturated with 6·7 per cent., although
not become cooled down to 3·19° Cls. (37·74° Fahr.), but o
5° Cls. (41·0° Fahr.) The latter case therefore inconte
offered a more favourable opportunity for decompositio
formation of mould.

These examples clearly show that if errors arise in reg
this question, they are generally caused by a non-observat
the temperatures at which the relative humidity is
tained.

Some writers who wish to speak a good word for the clim
Davos quote, as a proof of the dryness of the air, the fac
raw meat which is exposed for some time to the air, here be
perfectly dried and fit for use.* In every case, however, i
great mistake to seek an explanation of this fact in th
relative humidity of Davos. Dr. Reimer is certainly ri

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* This meat looks brown-red, is so hard that it can scarcely be cut with
and has a very agreeable taste.—EDITOR.

rejecting Ramann's* interpretation of the dryness of the air by the well-known method of drying meat, and in stating, as an objection, that the same result is also obtained elsewhere.†

We go even further by asserting that in other places which have a lower relative humidity than Davos, and at a sufficiently low temperature, meat can even be *better* dried. Ramann, too, is convinced of the dryness of the Davos air, but for too many of his conclusions he depends upon the deceptive statistics of the relative humidity. If in Davos meat can be dried without putrefying, the critical point—inasmuch as the relative humidity is always under 100 per cent., and a desiccation therefore must always take place—is *that the temperature of the air is so low that the rapid evaporation of the water contained in the meat renders putrefaction impossible.* The length of duration of the drying process depends here, as well as in the lowlands, principally on the degree of relative humidity of the air at the time; the low *absolute* humidity being not of the slightest influence. Supposing that we have in the lowlands during the winter the same favourable conditions as in Davos, no impediment would exist which could render it difficult for the inhabitants to enjoy the delicacy of dried meat. Unfortunately, however, the circumstances there are different, the sufficiently low temperatures absolutely necessary to hinder putrefaction not occurring. At noon, for example, the meat would repeatedly be thawed. In 1862 Dr. Spengler published an article in a medical journal (*Deutsche Klinik*), in which he mentioned that some inhabitants of Davos had become ill through eating mouldy bread. This remark was assailed with some degree of sophistry by Dr. Reimer, who, in his "Klimatische Wintercurorte," page 101,‡ asserted that the mouldy bread spoken of by Dr. Spengler was incompatible with the dry air ascribed to the Davos climate. Dr. Spengler has, however, in contradistin tion to other authors, taken the right way not to confound appe ance with reality.[*] It is evident that in speaking of illness caus by eating mouldy bread he had taken into consideration t peasants' manner of living and of keeping their provisions.

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* "The dryness of the Davos air during the winter season (the time of snow, melting excepted) is further proved by the fact that the natives are able to dry meat in the open air. The same attempt would in the lowlands inevitably fail." Taken from G. Ramann's "Davos in seiner Eigenschaft als klimatischer Sommer- und Wintercurorte." Page 16.—EDITOR.

† "The favourite food of the Icelander is fish, and the chief nourishment of the inhabitants of the Faröe-Islands consists of mutton, both dried in the open air." Taken from Dr. Reimer's "Klimatische Wintercurorte," page 101.—EDITOR.

‡ "Dr. Spengler mentions that the Davos inhabitants eat much old mouldy bread, and suffer in consequence from catarrh of the stomach, a circumstance from which may be drawn the conclusion that the air of Davos contains a pretty high degree of moisture." Taken from Dr. Reimer's "Klimatische Wintercurorte" page 101.—EDITOR.

If the natives of Davos in winter keep bread in a room i habited by five, six, or more persons, and from which all venti tion is excluded by carefully filling up the crannies with mo etc., the natural consequence is, that this bread becomes moul notwithstanding the fresh dry air to be found out of doors. W ever has entered such a room will certainly not doubt the tr of our argument. We only need to speak with our coun doctors, who are frequently called to attend patients living similar rooms almost hermetically sealed, to learn that the w often run down with water, and that an atmosphere exists wh is very far from being pleasant. We should rather ask how i possible to live in dwellings like these. The phenomenon m tioned by Dr. Spengler occurs everywhere and in all clima and presents therefore no serious argument for the gre moisture of the air of Davos.

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[*] A. Spengler, "Die Landschaft Davos, Klimatalog.—medizinische Skiz pages 14, 15, 16, 17, 18, 23, 35, 36, 38, 39, 48.—AUTHOR.

THE QUESTION OF ATMOSPHERIC MOISTURE IN NUMBERS.

AFTER having occupied ourselves in the foregoing chapter mostly with the question of Atmospheric Moisture in general, we will now enquire into the numbers, from which we shall draw our principal arguments. It is necessary to say beforehand that the observations in the years 1874, 1876, and 1877, have given results in regard to the relative humidity of Davos, which awake mistrust in the previous measurements. The mean relative humidity of this place, ascertained at an average temperature of air of 2·73° Cls. (36·91° Fahr.) is 73·7 per cent (1874, 1876, 1877). It is known to what errors the psychrometric investigations are liable, as, for instance, that the results obtained during a calm are always too high. For this reason it is a great advantage that it is possible to ascertain the relative humidity also with the hair-hygrometer, as we can thus compare both measurements, and, as soon as the circulation of the air is lively enough, to control the one by the other. In this way numbers are obtained which are very near to the true value.

As it has been often asserted that the air of Davos is moister than that of Montreux, we will examine into the subject, although this opinion is not even confirmed by the favourite statements based on relative humidity.

According to a mean found through the observations of several years, Montreux has a relative humidity of 79·7 per cent., ascertained at a mean temperature of the air of × 5·40° Cls. (41·72° Fahr.), and Davos has a relative humidity of 76·6 per cent., ascertained at a mean temperature of the air of—1·10° Cls. (30·02° Fahr.) for months October, November, December, January, February, Mar and April. We breathe the air of Montreux in the same prop tions as that of Davos. The different temperatures which the of the two places had before being inhaled are heightened in lungs to the temperature of the human body, namely, 37° Cls. Fahr.) The respective elastic forces of the aqueous vapour raised unequally, but to the same temperature, and we can the fore say that the absolute amount of vapour remains unchang and that only the elastic forces are altered.

Consequently, if we wish to compare the air of Montreux w that of Davos as to their per-centages of relative humidity in gard to their drying influence on the human body, we must, final temperatures being in both places the same, viz., 37° (98° Fahr.), unquestionably also equalize the initial temperatu In order to do this, it is necessary to calculate what per-cent of relative humidity the air of Davos, which was measured —1·1° Cls. (30·02° Fahr.), shows when it is warmed to the temp ture of Montreux, *i.e.*, 5·40° Cls. (41·72° Fahr.)

Let the relative humidity of Davos, which had at —1·1° (30·02° Fahr.) 76·6 per cent., and which shall now be ascertai at 5·4° Cls. (41·72° Fahr.), be denoted by R.; the elastic forc vapour at —1·1° Cls. (30·02° Fahr.) s; the elastic force of vapou 5·4° Cls. (41·70°. Fahr.) by S; and the temperature of Davos b and temperature of Montreux by T. We shall then obtain :—

$$R = \frac{s}{S} \times \frac{273 + T}{273 + t} \times 76{\cdot}6^{*}$$

$$R = \frac{4{\cdot}23}{6{\cdot}72} \times \frac{278{\cdot}4}{271{\cdot}9} \times 76{\cdot}6 = 49{\cdot}4 \text{ per cent.}$$

We see, therefore, that quite different results are obtained measure the air of Davos under the same circumstances—th to say, at the same temperature as that of Montreux.

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[*] Having heard from the Author that this and the following formulas a the present form, frequently employed also in England, the Editor has not sidered it necessary to convert the values used into English measures. reader must, therefore, observe that the elastic forces of vapour are expres millimetres, the temperatures in degrees of Celsius, etc., and that only the have been reduced.

The air of Davos is saturated at 5·4° Cls. (41·72 Fahr.) with 49·4 per cent.; that of Montreux, at the present temperature, with 79·7 per cent., so that in Davos 50·6 per cent., and in Montreux only 20·3 per cent., can now be absorbed before the maximum of saturation is reached.

If we now raise the air of Davos and that of Montreux to the temperature which they receive in the lungs, or suppose that we could measure there both kinds of air and ascertain the relative humidity of each before water is abstracted from the lungs, in short find their drying power, we should obtain at 37° Cls. (98° Fahr.) the following numbers:—

$$\text{For Montreux: } R = \frac{6{\cdot}72}{46{\cdot}69} \times \frac{310}{278{\cdot}4} \times 79{\cdot}7 = 12{\cdot}78 \text{ per cent.}$$

$$\text{For Davos: } R = \frac{3{\cdot}23}{46{\cdot}69} \times \frac{310}{271{\cdot}9} \times 76{\cdot}6 = 7{\cdot}9 \text{ per cent.}$$

The air of Montreux, therefore, contains 12·78 per cent., that of Davos, under the same circumstances, 7.9 per cent. of the quantity of aqueous vapour possible at 37° Cls. (98° Fahr.) Now, as the cubic metre (35 cubic feet) of air is, at 37° Cls. (98° Fahr.), able to recive 43·5 grammes (735·150 minims) of aqueous vapour, 92·1 per cent. more of this quantity, *i.e.* 40·06 grammes (677·014 minims) can be absorbed and carried away in Davos, but only 87·22 per cent., *i.e.* 37·94 grammes (641·186 minims) in Montreux.

Three years ago we proposed that the numbers expressing the relative humidity, taken from meteorological tables, should in climatological works, always be quoted after reduction to a constant temperature, *i.e.*, that of the human body, 37° Cls. (98° Fahr.)

The supposition giving rise to this idea was, that these numbers should in every case indicate the influence of the air on the human body only, and not on inanimate objects or those which always accommodate themselves to the temperature of the air.

We will now proceed further in our comparison of the air of Davos with that of Montreux, and calculate directly in grammes (minims) the amount of water contained in a cubic metre (35 cubic feet) of air, in order to make use of the values obtained. If for this purpose we take the number of grammes of aqueous vapour contained in a cubic metre (35 cubic feet) of air as the same standard for Davos and Montreux (the absolute humidity, *i.e.*, the elastic force of aqueous vapour is consequently not the same) and if we suppose a to be the absolute humidity at temperature t and g to be the number of grammes of aqueo vapour contained in a cubic metre (35 cubic feet) of air, th according to Mariotte-Gay-Lussac's Law,

$$g = \frac{a}{0{\cdot}0034614\ (273 + t)}.$$ Further $a = rs$

therefore $g = \dfrac{rs}{0{\cdot}34614\ (273 + t)}$. For another temperature T

$$G = \frac{RS}{0{\cdot}34614\ (273 + T)}$$

The number of grammes being in both cases equal:

$$\frac{RS}{0{\cdot}34614\ (273 + T)} = \frac{rs}{0{\cdot}36414\ (273 + t)}$$

$$\text{or } R = \frac{s}{S} \times \frac{273 + T}{273 + t} \times r.$$

We find, therefore, in a cubic-metre (35 cubic-feet) of air Montreux:

$$g = \frac{79{\cdot}7 \times 6{\cdot}72}{0{\cdot}34614 \times 278{\cdot}4} = 5{\cdot}56$$ grammes (93.964 minims) aqueous vapour.

and in a cubic-metre (35 cubic-feet) of air in Davos:

$$G = \frac{76{\cdot}6 \times 4{\cdot}23}{0{\cdot}34614 \times 271{\cdot}9} = 3{\cdot}44$$ grammes (58·136 minims) aqueous vapour.

Because the inhaled air, if it is completely saturated with aqueo vapour in the lungs, can receive per cubic-metre (35 cubic-fee 43·5 grammes (735·150 minims) of water, consequently it wou give out in Montreux only 37·94 grammes (641·186 minims) p cubic-metre (35 cubic-feet), in Davos 40·06 grammes (677·0 minims). as in the former case before the inhalation 5·56 gramm (93.964 minims), and in the latter 3·44 grammes (58·136 minim were already present. According to Hermann's Physiology, th volume of air taken per breath by adults (men) is 3770 cubi centimetres (230 cubic-inches), i.e., 3·77 litres. The exhal aqueous vapour per cubic-metre (35 cubic-feet), i.e., 1,000 litre is therefore in Montreux 37·94 grammes (641·186 minims), i Davos 40·06 grammes (677·014 minims).

	IN MONTREUX.		IN DAVOS.	
Per Breath	0·1430338 grms. (2⅓ drops)	(2·417271 minims) (2⅓ drops)	0·1510262 grms. (2½ drops)	(2·5523428 minims) (2½ drops)
Supposing 18 breaths to be taken per minute,				
Per Minute	2·5746 ,, (43 drops) ,,	(34·5107 ,,) (43 drops)	2·71847 ,, (45½ drops) ,,	(45·94214 ,,) (45½ drops) ,,)
Per Hour	154·4765 ,,	(2610·6529 ,,)	163·1083 ,,	(2756·5303 ,,)
Per Day	3707·436 ,, (7lb.207 ,,)	(62655·668 ,,)	3914·5991 ,, (7lb.414 ,,)	(66156·7248 ,,)

We see from these calculations that the quantity of aqueous vapour which is given out in Davos by the process of breathing is 207·2 grammes (3501·68 minims) per 24 hours greater than that given out in Montreux, and at the same time we obtain an idea of the amount of water generally given out by this process.

Be it lastly remarked, that the above numbers will be lowered a little if we take into consideration the relations of Davos and the state of consumptives in general, because for the latter we certainly cannot fully accept the capacity of the lungs, ascertained by Dr. Hermann to be 3770 cubic centimètres (230 cubic inches) per breath.

CLASSIFICATION OF CLIMATIC WINTER RESO WITH RESPECT TO THEIR PER-CENTAGE RELATIVE HUMIDITY.

IN this chapter we will employ our new suggestion, prev
spoken of, and show the difference which exists betw
classification made on the basis of *our* calculations a
example, that made by Dr. Reimer in his "Klima
Wintercurorte," from which we have taken the following me
logical data:—

The means of the per-centages of relative humidity were
for the months October, November, December, January, Feb
March, and April, and are reduced collectively to the ter
ture of the human body by the formula

$$R = \frac{s}{S} \times \frac{273 + T}{273 + t} \times r$$

in which t represents the mean of the temperatures at whi
relative humidity for the above months was measured.

A comparison of our statements in per-centages, as they
ence in reality the human body, which has a constant te
ture of 37° Cls. (98° Fahr.), with the classifications co
generally by the authors of climatological treatises, by dire
ployment of the numbers to be found in the meteorological

will show to everyone the weakness of statistics such as those made, for instance, by Dr. Reimer. Even physicians are often completely confused by them, so that they speak of the air of Davos as being moist, although the numbers on which they base this assertion relate only to things which always accommodate themselves to the temperature of the air, but are of no value in other cases.

Dr. Reimer's Statistics as contained in his book.			Dr. Reimer's Statistics as reduced collectively to the temperature of the human body, 37 deg. Cls. (98 deg. Fahr.)		
1.	Alexandria	59·0 per cent.	1.	Davos	7·1 per cent.
2.	Nice (6)	59·9 „	2.	Lugano (4)	10·5 „
3.	Cannes (1)	62·2 „	3.	Meran	11·2 „
4.	San Remo	66·7 „	4.	Arco (2)	11·5 „
5.	Cairo	69·7 „	5.	Montreux	12·3 „
6.	Madeira	69·7 „	6.	Cannes (1)	13·9 „
7.	Meran	70·5 „	7.	Venice	14·3 „
8.	Mentone	70·7 „	8.	Pisa (5)	15·1 „
9.	Arco (2)	72·2 „	9.	Pau	15·4 „
10.	Catania	72·8 „	10.	Nice (6)	15·6 „
11.	Palermo	75·5 „	11.	San Remo	16·1 „
12.	Ajaccio (3)	76·0 „	12.	Alexandria	17·2 „
13.	Pisa (5)	78·8 „	13.	Ajaccio (3)	18·4 „
14.	Lugano (4)	77·5 „	14.	Catania	19·8 „
15.	Montreux	80·8 „	15.	Palermo	20·4 „
16.	Pau	81·0 „	16.	Cairo	21·4 „
17.	Venice	81·0 „	17.	Madeira	22·8 „
18.	Davos	83·8 „	18.	Mentone	22·9 „

1. Mean from November to March inclusive.
2. „ „ „ „
3. „ „ January „
4. „ December to February „
5. „ November to March „
6. „ October to February „

We have, for example, made experiments with furniture, which favour the assertion that the air of Davos has a low absolute humidity. Pieces of furniture which had been used for twelve years in the lowlands without becoming injured, cracked when they were brought to this place. Our air, which in heated rooms receives approximately the same temperature as that of the lowlands, must produce, of course, in consequence of its originally low amount of water, a more desiccating effect.

The absolute quantity of water suspended in the air o
lower than that in the above-mentioned resorts, and
this that man, with his constant temperature of 37° Cls. (
to which all temperatures of the air must accommod
selves, has to deal. Everybody who, for physiological
declares an air to be moist, which at—10° Cls. (14·0° F
90 per cent. relative humidity, and calls another dry, w
tains 60 per cent. at 15° Cls. (59° Fahr.), makes a great

We hope that we have now fully explained all points
to be justified in stating the following facts:—

1. The air of Davos is in fact drier than that of Montr

2. The bare numbers of the per-centage of relative h
taken from the meteorological tables, and used for classi
of climatological works, when employed for physiological p
are confusing, and absolutely of no value. These numbe
were found at different temperatures, must always be re
a uniform temperature.

3. We are right in asserting that the sensations of m
and of sultriness are principally caused by the absolute
of water suspended in the air.

CLIMATOLOGICAL NOTICES.[*]

IT is very easy to understand that the growing importance and reputation which Davos as a health-resort enjoys among physicians and patients, induce many to seek for places in like situations.

Wishing to establish a second Davos, they advertise other climatical stations, which long for a similar success, in circulars and "puffs," as an ideal Davos, attributing to them the important curative qualities of this place, even in a higher degree.

The results attained in Davos can no longer be ignored, as they show themselves not only in the ever-increasing number of visitors, but also in the large extension of the place itself.

The properties of its climate, especially favourable to its indication, cannot be denied even by its most obstinate enemies, although they do their utmost to injure it.

In the field of medical sciences lively discussions have taken place, and many a lance, pro. and con., has been broken *sine ira et studio;* many too with eager zeal. Various publications have appeared also on climatological questions, which, at the first glance, showed that the sources from which they originated were not altogether pure. We encounter on the one hand entirely false opinions, and on the other hand statistics which involuntarily gave rise to the suspicion that they were intended

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[*] Taken from the Davoser Blaetter Vol. x., Nos. 18 and 19.

as mere puffs, which, positive ground and scientific base
sought to support themselves on artificially constructed
cal combinations, whose falsities were not apparent to
initiated, but self-evident to the meteorologist.

When at last, however, the favoured theme of "w
weather" had become exhausted, and had shown that
be useless longer to contest the climatical conditions of
truce occurred which distinctly declared that it would be
to refuse further recognition to this well-known health-re

But this truce was only of short duration. Soon fres
nents began to play again the old game, with the sole v
that now not only the favourable conditions of Davos were
attributed to other places, but that also the public was
into believing that these conditions existed there even in a
degree. As is generally the case under such circumsta
also here: the name Davos could not be mentioned
calling forth attacks on the place.

Far be it from us to affirm from a climatological point
that places with like properties do not exist. Davos ha
cause to fear competition, so much the less because, were i
the size, it could only shelter a tenth part of the consum
who live, according to statistics, in any one of the larger

Quite apart from the fact that a health resort is by no
called into existence by the publication of (even partly erro
meteorological data, a favourable prognostic of a medical s
is also not sufficient to produce such an effect, particularly
the pretended more-favourable factors do not prove them
to be in fact so extraordinarily favourable. Besides thi
further conditions, also undoubtedly of the greatest impor
are necessary for the establishment of a climatical station,
however to mention here would require too much time
space.

St. Moritz-Dorf (Upper Engadine) takes a prominent po
among the places which intend to rival Davos, and some
ago J. Badrutt, the proprietor of the Hotel St. Moritz-K
made an earnest effort to attain this aim. We do not a
regard this project with envy, nor do we intend to throw
doubts beforehand of its ultimate success, it not being our
to pass judgment on the conditions of this place. We
found it, however, interesting to examine into the ways

means which have lately been adopted in establishing new health-resorts.

The fact that our judgment of the climatical conditions of a place must be principally based on meteorological data and topographical peculiarities has only been understood in modern times. At the present day no thoughtful physician would endeavour to deny the value of the results obtained by meteorological investigations. We can, therefore, easily understand the motive that induced E. Badrutt to make use of similar data in his English and German circular, which he sent out at the beginning of this year, and in which he inserted a table containing the meteorological observations of St. Moritz-Dorf and Davos. Moreover this motive becomes even more self-evident when we say that the numerical combinations there quoted were much more favourable for the former than for the latter place.

In any case, however, this publication attained its purpose, namely, that of influencing the public, while those who were in any degree acquainted with the situation and the other properties of St. Moritz became involuntarily suspicious. St. Moritz-Dorf is a day's journey distant from Davos, and situate only 275 metres (902 feet) higher—Badrutt seems to lay much weight on this greater elevation—and yet such differences are found in the meteorological values! This was very striking to meteorologists. It was, therefore, natural for us to examine a little more closely into the truth of these values, and to subject them to a severe examination.

A comparison of the data at hand for the years 1876, 1877 and 1878, with the data published by the Swiss Meteorological Central Station at Zurich showed that of 138 numbers given by E. Badrutt 71 did not tally with those of this station. It is indeed fatal that 51 per cent. printer's errors are to be found in Badrutt's publication! A still more unfavourable impression was produced upon us by the tables of St. Moritz, when we found in the 5th and 6th concluding parts of the 15th year (1878) of the Swiss Meteorological observations (page 349, table St. Moritz-Dorf) that the exceedingly low statements concerning the "total rainfall" and "number of days with rain, snow, &c.," were marked in four columns with four notes of interrogation. (?) It is evident that the editors of the official tables were struck with the small amount of rainfall.

We are not able to make further comparisons betw Moritz-Dorf and Davos, the Central Station of Zurich been forced to cease the publications, as they had rece communications for some time past from the former plac

Another place which has lately attracted the attention physicians is Andermatt, a village lying on the St. G route. Most of the Swiss (Freie Rhaetia, Neue Zuercher &c.), and many foreign newspapers published the followin of this place :—

“Andermatt will soon rival Davos as a new winter resort for consumptives. The physicians of the Central Medical Society have passed a very favourable judgment place, and they prognosticate for it success, as it has mo and bright days, and less amount of snow and cloud than whilst its situation is 200 feet lower and its amount of per cent. less.”

We will now examine, on the basis of the official meteoro tables, into the differences existing between the climatical tions of Andermatt and Davos, and see if they really favo former.

We have for this purpose collected the means of the la years, which have been already published, and, as in 1 observations were made in Davos, we have calculated the a values from 1876 to 1879. (See next page.)

One glance at this table will at once suffice to show tha notice which appeared in the above-mentioned papers is n more than an ordinary “puff.”

It lies far from us to pass a decided judgment on the conditi Andermatt, but all will agree with us when we call the man recommending one place at the expense of another highly coming. As we have already said, a great stress was laid i circular of St. Moritz-Dorf on the higher situation of this pla contrast to Davos. In the case of Andermatt, which has an e tion of 1448 metres (4750 feet), an advantage is found in its b as it is said, 200 feet lower (it does, in fact, not lie 200 fee 870 feet lower). The less amount of cold (which, however, be found in Davos, and not in Andermatt) concluded from th if the average is taken from the annual means of the years to 1880, 0·07° (0·13°) a difference on which great conclusions scarcely be based. If we now examine our table we find tha

METEOROLOGICAL SURVEY OF ANDERMATT AND DAVOS.

	Number.						Mean Amount of Cloud.		Mean Annual Temperature in				Total Rain (Snow) Fall in				Number of Days with Rain and Snow.	
	Of Bright Days.		Of Dull Days.		Of Snowy Days.				Cls. deg.	Fahr.	Cls.	Fahr.	Milli-metres.	Inches.	Milli-metres.	Inches.		
	Andermatt.	Davos.	Andermatt.	Davos.	Andermatt.	Davos.	Andermatt.	Davos.	Andermatt.		Davos.		Andermatt.		Davos.		Andermatt.	Davos.
1875 ...	93	...	123	...	92	...	5·3	...	2·24	36·03	...	...	1879·9	74·068	...	...	166	...
1876 ...	94	112	133	84	86	43	5·6	4·7	3·14	37·65	3·19	37·74	1285·2	50·637	1052·6	41·472	140	159
1877 ...	74	98	143	55	95	96	5·9	4·4	2·73	36·91	2·72	36·90	1337·9	52·713	1171·1	46·141	160	164
1878 ...	59	100	131	70	86	77	6·1	4·6	2·12	35·82	2·09	35·76	1419·6	55·932	1279·1	50·397	170	158
1879 ...	63	116	160	71	73	102	6·3	4·3	2·00	35·60	2·27	36·09	?	...	892·6	35·168	113 ?	170
Mean from 1876–1879	73	107	142	70	85	80	6·0	4·5	2·50	36·50	2·57	36·63	?	58·338	1098·9	43·296	146 ?	163

Andermatt 73 bright days were noted, as compared wi
Davos, and 142 dull days, as compared with 70 in Dav
days with snow-fall show a similar proportion, 85 days
Andermatt, as compared with 80 in Davos.

The amount of cloud which has been also quoted as
able argument, does not alter the case, for Davos with
at all inferior to Andermatt with 6·0. The amount of
was not regularly measured in 1879 in Andermatt, on a
which we are not in the position to take it here into cons
but already the few numbers we possess clearly point
also in it is to be found no advantage for the place. Of g
portance, moreover, for the meteorologist is the numb
days when falls of rain, snow, etc., occurred. When we
these values, however, in the meteorological tables, we w
astonished to find that the number of these days had, s
quite abnormally diminished in Andermatt. The influen
were here at work are incomprehensible to us, wherea
of interrogation (?) we found added to the value in quest
Official Annual Table is very comprehensible to us.

Of the subjects quoted in the above-mentioned noti
now remains to speak of the circulation of air, t
amount of which existing in Andermatt has also been c
as a prominent feature of this place. Although the ob
made on this are not included by the Swiss Meteorologic
Station in its Annual Surveys, still the special tables at
that the circulation of air is very low in Andermatt in
to that of Davos. We are not sufficiently informed on
graphical conditions of this place to be able to decide w
cause is to be found in these, or in other conditions ; n
try to solve the question as to whether a smaller amou
than that to be found in Davos, is advantageous or not t
resort for consumptives. In any case, however, we do
far in asserting that a too-frequently occurring absenc
which nearly resembles stagnation, is, from a climatolo
of view, not considered beneficial.

In the foregoing lines, the contents of which are f
official data, we trust that we have set on a right t
notices so rapidly spread by the Press, and we hop
papers where these notices appeared will make use of t
statements.

ANNUAL SURVEY OF THE METEOROLOGICAL CONDITIONS OF DAVOS, CONSTRUCTED IN CURVES, FOR 1876.

THE curves are constructed from the monthly means, the tenths, degrees, inches, and per-centages being taken into consideration. In a cubic-metre (35 cubic-feet) of air, saturated at 37° Cls. (98° Fahr.) with water, are contained 43·50 grammes (735·15 minims) of aqueous vapour in weight. The real mean amount of water in weight can therefore easily be found (per month) from the curve ——, representing the per-centages of relative humidity reduced uniformly to the same temperature of 37° Cls. (98° Fahr.), because the elevation of this curve indicates the number of per-centages which are present out of 43·5 grammes (735·15 minims) possible. In January, for instance, the curve shows 5·3 per cent.

100 : 43·5 grammes of water = 5·3 p.c. : x = 2·3055 grammes of water in the cubic-metre of air.

(100 : 735·150 minims of water = 5·3 p.c. : x = 38·9629 minims of water in the 35 cubic-feet of air).

94·7 per cent. or 41·1945 grammes (696·1871 minims) are therefore still required to complete saturation, i.e., can still be given out per cubic-metre (35 cubic-feet) by the process of breathing.

In examining the increase and decrease of the humidity, we see that it goes exactly contrary to the temperature: the warmer

the air is so much the more aqueous vapour does it co
colder it is so much the less.

MEAN RELATIVE HUMIDITY OF DAVOS IN 1876.
Reduced to 37° Cls. (98° Fahr.) Temperatur

January	5.8	per cent.
February	6·6	„
March	7·5	„
April	10·5	„
May	11·0	„
June	16·2	„
July	18·2	„
August	18·7	„
September	12·9	„
October	12·1	„
November	7·1	„
December	6·8	„

Annual Mean = 11·1 per cent. =
mes (81·12 minims) of aqueous
Desiccating power still present = 88·9 per cent. = 38·
(654·03 minims) of aqueous vapour per cubic-metre (35
of air.

Dr. Siebenmann published on December 29th, 187
newspaper (*Basler Nachrichten*, Supplement No. 307)
entitled, "Wiesen as a Winter Resort for Consum
which he said the following:—"In Wiesen, lying 1
(4770 feet) above the sea, the amount of vapour in the
to be very great (80 rel.)"

The author, whose deductions are advantageous for
considers this great humidity as a favourable prop
climate, while in fact the air, on account of the low
perature, must produce a very desiccating effect.

METEOROLOGICAL OBSERVATIONS,

TAKEN IN

DAVOS-PLATZ,

FROM 1876–1880.

BY

W. STEFFEN,

OBSERVER AT THE SWISS METEOROLOGICAL
STATION, DAVOS-PLATZ.

NOTICE FOR THE FOLLOWING METEOROLOGICAL TABLES.

The scheme is accommodated as nearly as possible to that accepted by the International Meteorological Congress.

It is to be observed:—

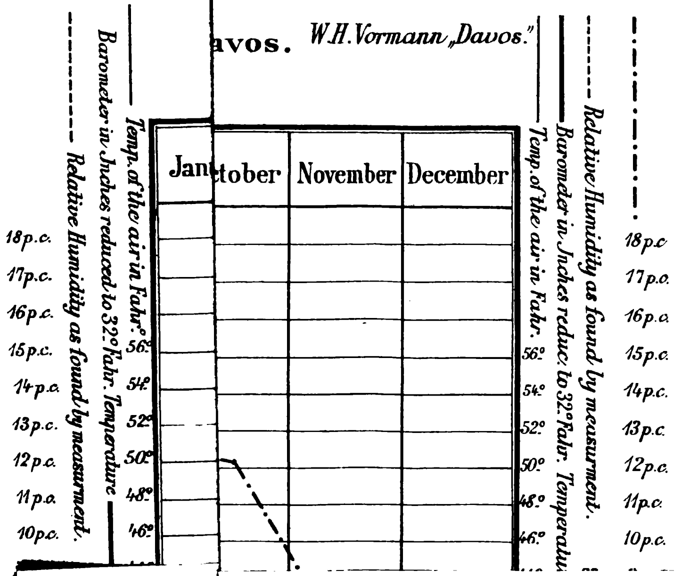
1.—The Maximum and Minimum of the Atmospheric Pressure and Temperature are always taken from the Readings made at the usual hours of observation, 7 o'clock, 1 o'clock, 9 o'clock.

2.—The Temperature Mean is reduced by employing the quantity found for the mountain-station of St. Bernhard also for Davos, in order to get from the mean of the readings at 7 o'clock, 1 o'clock and 9 o'clock, the true daily mean.

3.—The days with rain or snow all are reckoned, on which a measurable quantity fell of rain, snow, or both together.

4.—A day on which several thunderstorms occurred is reckoned only as one.

5.—As bright days are reckoned those whose mean amount of cloud < 2; as dull days, those whose mean amount of cloud > 8.


avos.
W.H. Vormann „Davos."
Jan
tober
November
December
Temp. of the air in Fahr.°
Barometer in Inches reduced to 32° Fahr. Temperature
Relative Humidity as found by measurment.
Temp. of the air in Fahr.
Barometer in Inches reduc. to 32° Fahr. Temperatu
Relative Humidity as found by measurment.
18 p.c.
17 p.c.
16 p.c.
15 p.c.
14 p.c.
13 p.c.
12 p.c.
11 p.c.
10 p.c.
56°
54°
52°
50°
48°
46°

SUR

	inimu
	Fahr
Ja	-10·3
Fe	-5·2
Ma	0·5
Ap	18·6
Ma	24·6
Ju	35·7
Ju	44·4
Au	35·7
Se	30·7
Oc	22·4
No	—3·8
De	—1·6
Ye	-10·3

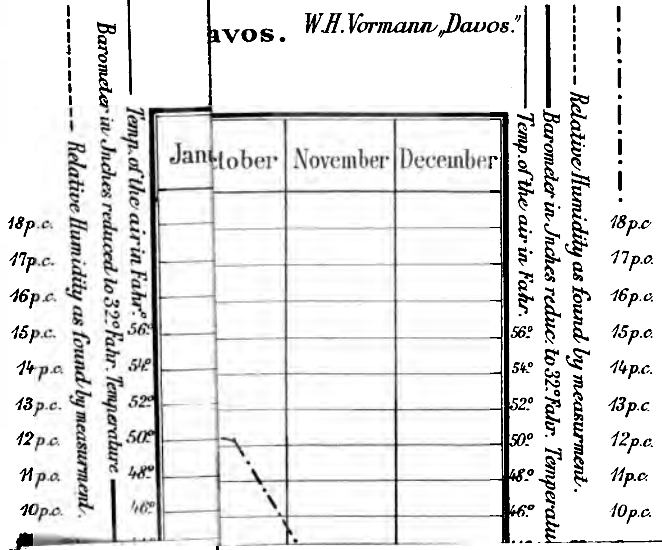
THE direct Solar Rays (*Solar Radiation*) on the
nter 1876–77, in Davos, by **Francis Redford**,

187 Days Mo	ARY.	FEBRUARY.		MARCH.		APRIL.	
	m in it degs.	Maximum in Fahrenheit degs.		Maximum in Fahrenheit degs.		Maximum in Fahrenheit degs.	
	In Sun.	In Shade.	In Sun.	In Shade.	In Sun.	In Shade.	In Sun.
	Degs.	Degs.	Degs.	Degs.	Degs.	Degs.	Degs.
	121·3	30·5	138·5	14·4	60·0	52·2	142·0
	122·5	33·2	58·4	20·1	141·4	38·2	126·2
	129·0	32·2	62·2	29·8	58·5	55·0	149·2
	137·5	34·9	141·4	45·8	141·0	49·1	107·1
	133·0	29·8	143·0	37·8	106·0	—	—
	89·3	34·9	123·6	27·2	91·5	—	—
	134·3	39·0	114·0	26·9	93·0	—	—
	119·0	37·0	83·2	26·5	128·9	—	—
	105·9	37·2	75·0	24.2	125·0	—	—
	83·6	41·5	150·0	22·3	132·5	—	—
	125·3	42·3	116·4	22·9	126·0	—	—
	70·0	43·1	125·5	30·5	131·0	—	—
	90·0	34·9	75·0	26·1	53·0	—	—
	121·0	33·8	67·2	26·2	59·5	—	—
	45·5	47·2	147·2	35·0	96·0	—	—
	78·0	46·6	144·5	49·1	147·1	—	—
	125·6	29·0	50·0	43·7	146·5	—	—
	124·2	27·8	62·2	40·0	115·2	—	—
	125·2	40·1	134·5	50·4	141·0	—	—
	130·6	36·0	98·3	49·1	132·2	—	—
	74·0	26·5	64·3	40·1	131·0	—	—
	90·0	30·8	134·0	41·3	140·0	—	—
	115·0	28·0	142·3	32·0	126·8	—	—
	126·9	28·8	144·0	39·0	137·8	—	—
	75·0	38·4	95·0	42·0	162·8	—	—
	79·5	43·3	159·2	48·3	153·8	—	—
	130·0	27·5	135·5	41·3	149·0	—	—
	141·4	19·0	134·2	46·7	143·6	—	—
	131·7	—	—	53·3	145·0	—	—
	140·1	—	—	51·1	135·2	—	—
	43·0	—	—	47·2	141·9	—	—
Mont in Fa	108·30	34·76	111·37	36·46	122·33	—	—

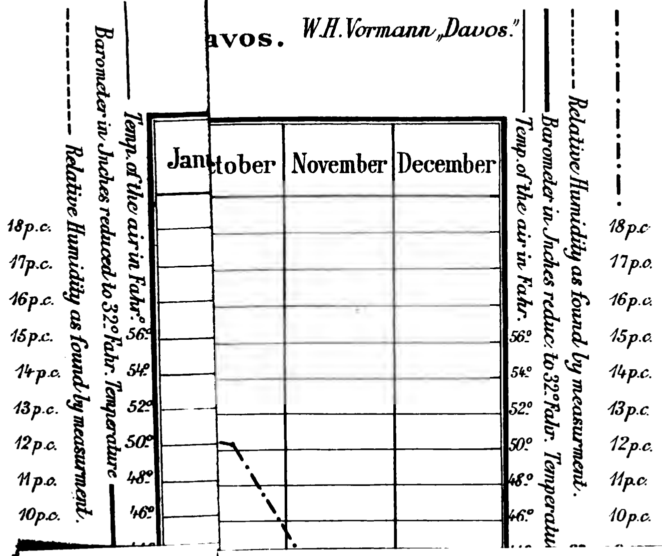
ndebted to F. **Redfern**, Esq., for sending
ble.

1877.	
January	—
February	—
March	—
April	—
May	—
June	
July	
August	
Sept.	—
October	—
November	—
December.	—
Year	—

avos. W.H. Vormann „Davos."



avos. *W.H.Vormann „Davos."*



THERM e Maximum Black-Bulb Thermometer in vacuo,

1879. Days of the Month.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	Maximum in Fahrenheit degs.		Maximum in Fahrenheit degs.		Maximum in Fahrenheit degs		Maximum in Fahrenheit degs.	
	In Shade.	In Sun.	In Shade.	In Sun.	In Shade.	In Sun.	In Shade.	In Sun.
	Degs.	Degs.	Degs.	Degs.	Degs.	Degs.	Degs.	Degs.
1	64·5	126·0	61·2	121·8	49·2	109·5	16·3	32·5
2	67·5	130·5	66·4	128·5	39·0	40·5	11·0	44·6
3	71·5	132·3	50·0	120·7	26·7	95·3	10·0	39·0
4	71·5	130·5	56·5	118·5	34·5	108·0	32·5	79·3
5	71·3	137·0	59·0	122·0	34·0	105·5	31·5	78·5
6	70·0	130·5	57·8	120·5	34·3	106·3	34·0	99·0
7	62·3	127·3	55·2	117·3	31·0	50·6	20·3	67·7
8	66·2	131·0	58·8	119·6	30·6	118·2	4·0	79·5
9	47·0	74·0	56·2	118·5	42·2	117·5	5·2	85·0
10	50·2	128·3	54·5	117·7	40·5	112·0	10·0	76·3
11	56·2	127·5	50·0	112·8	38·0	80·3	13·5	95·5
12	59·5	122·7	56·3	117·0	34·5	97·5	14·7	96·3
13	60·5	121·0	60·5	122·5	18·5	42·0	20·0	89·5
14	64·5	125·5	60·0	121·3	21·0	94·2	16·5	85·6
15	67·0	116·0	48·2	112·6	14·1	94·5	11·8	92·0
16	67·3	133·6	26·5	45·8	19·5	54·6	19·0	96·5
17	57·5	110·4	28·5	110·6	26·0	43·5	28·5	105·0
18	61·5	132·3	37·0	66·5	29·5	50·0	29·0	102·5
19	60·5	134·0	41·3	115·6	30·7	120·5	30·8	100·0
20	50·0	122·7	51·2	93·0	32·0	52·3	35·5	107·2
21	53·3	84·5	34·0	107·6	30·5	110·5	34·0	105·0
22	54·2	116·5	31·2	113·5	44·5	110·0	35·6	111·7
23	53·0	114·5	36·2	107·6	46·5	122·3	34·7	108·5
24	63·5	126·3	47·5	110·2	39·0	41·5	33·5	106·0
25	48·5	91·3	45·2	108·5	29·7	124·0	34·5	110·6
26	34·3	50·5	47·5	109·3	19·5	83·7	32·0	105·5
27	40·5	88·2	50·0	115·0	16·3	86·5	32·3	107·0
28	53·5	121·4	52·5	115·7	19·0	101·0	31·5	105·7
29	46·5	112·0	57·0	120·0	30·0	108·0	33·0	105·0
30	58·0	124·8	55·2	116·4	16·0	89·5	39·3	93·5
31	—	—	51·5	103·7	—	—	35·6	117·5
Monthly mean in Fahr. degs.	58·39	117·44	49·74	111·27	30·56	87·33	24·81	89·60

w Observatory.

SURVE

	nimum.
	Fahr.
Ja	—5·62
Fe	6·26
Ma	2·30
Ap	18·86
Ma	25·70
Ju	38·30
Ju	36·14
Au	45·14
Se	30·02
Oc	17·06
No	1·22
De	-15·34
Ye	-15·34

FR.
in degs.
In inch.
egs.
3·7
9·0
9·0
6·3
6·5
8·0
8·0
8·0
6·0
8·0
2·5
4·0
2·5
9·6
1·4
4·5
4·0
1·5
4·0
0·5
5·5
9·0
5·6
6·5
7·5
6·5
0·0
0·5
0·0
4·0
2·0
·23

Medical Aspects.

INDICATIONS & COUNTER-INDICATIONS
OF
DAVOS, SWITZERLAND,
WITH SOME STATISTICS,

(Reprinted from the Edinburgh Medical Journal for June, 1881).

BY

DR. O. PETERS,
Physician at Davos.

G

III.—MEDICAL ASPECTS.

PRINCIPIIS OBSTA ! Making use of an essay published by Dr. A. Spengler in the *Bericht über die Ratischen Bader und Curorte*, I take the liberty to introduce the following medical notices on Davos. Since about fifteeen years, Davos, a valley in the Grisons, 1556 m. above the sea-level, is known as a sanatorium for people suffering from phthisis. In 1862 Dr. Spengler gave an account of complete absence of pulmonary consumption at Davos, and urged, no place might be more suitable for treating chronic disease of the chest. Thus every year the number of patients coming in search of help against this complaint of human society was increasing, and a great number returned home cured for ever. Now, I hope it may not be quite superfluous to publish some hints for physicians, very much being written already by laymen on Davos, its inhabitants, geological, meteorological, and other circumstances.

The chief mistake often made by physicians in climatic treatment is to send the patients hither in a stage in which they might not be rescued from the jaws of death. Indeed, it would be cruel to recommend the high altitude of Switzerland to a man suffering from high hectic fever, intense night-sweats, wasting, persistent and distressing cough, without any strength for resistance against the exciting Alpine climate, or even complicated with organic disease. He had better stop at home and try the sunshine of the south coast.

I suppose, to-day no medical man would hesitate to concede that pulmonary consumption is to be considered as a consequence of the impairment of the general health by several bad influences. Decidedly such a disease might be cured in the high altitude as quickly and surely as nowhere else. By the pure, fresh air excit-

ing the respiration, the circulation of the blood and t
by the low barometic pressure and the atmospheric
and the expansion of the lungs thereby caused, the
body is soon strengthened, the appetite increasing ever
food being assimilated without any trouble, the sleep
roborative, the original weight being regained by-an
this way the local affection of the lungs gradually is di
lastly cured, together with the improvement of th
health.

Dr. Spengler, in the above-mentioned essay, appointe
dications, well confirmed by experience.

1. Prophylactic residence.
2. Catarrhal phthisis.
3. Induration of the lung.
4. Chronic bronchial catarrh.
5. Remainders of
6. Nervous asthm
7. General weakne

1. Everybody with family or hereditary predisposit
settle in a high mountain climate for several years,
strengthened enough to undergo his daily occupatio
running the risk to die of phthisis. In these cases we
far the best results. The same also in those case
hæmorrhage suddenly occurs, the physician not being
detect anything but perhaps at one little patch the a
sounds slightly diminished. These hæmorrhages usua
the bronchial mucous membrane by congestion of the
tenderness of the bloodvessels, and very often are the
of an acute and rapidly increasing phthisis. By tho
rhages *no* counter indication is given. On the contrar
very seldom repeating at Davos, and by a longer res
patient will be saved from pulmonary consumption.

2. At the top of the lung even the slightest catarrh
fest, by no means should the physician hesitate to send
into a high altitude. Here is one exception, how
climate of Davos being very exciting indeed, a patien
from pulmonary catarrh together with an erethic const
too irritable nerves, should *on no account* be sent hither
condition has been shown to grow worse very rapidly
Very soon an inflammation of the adenoid tissue is to b
at last softening is present, and death unavoidabl
gallopans).

3. Consolidation of one or both lungs may be cured a

absorption. But nevertheless the affected area of the lung usually appears for a long time not quite in order, yet because the bronchial mucous membrane is changed into fibroid tissue. The same we find in the lower parts of the lung; the epithelial elements after an acute pneumonia remaining behind unresolved often get absorbed in an uncommonly short time. But sometimes the improvement does not proceed in this way, several tubercles being intermixed, which may not be healed but by softening, of course only within a longer time. On that account patients with one lobe of the lung mixed with tubercles had better stop at home. If only the top of the lung is affected by consolidation, a climatic treatment still may be proved, as it is confirmed by experience that softening goes on at Davos very slowly, usually without any high fever or other disagreeable occurrences. And this may also be the reason why we do not see at Davos as many hæmorrhages as elsewhere, the bloodvessels of a cavity being obliterated long before getting corroded by the matter of the melted tissue. Of course it would be very ridiculous to expect Davos or any place else in the world to be free of hæmorrhages. Hæmoptysis occurs at Davos, as well as at Hastings or Madeira, sometimes even fatal, a larger bloodvessel being corroded, or a bloodless, weak patient being attacked by frequent though little hæmorrhages. But these occurrences are by no means the result of the climate of Davos; nay, I hope to convince the reader by the following statistics that hæmorrhages do not occur at Davos as often as in the lower country. The chronic inflammation proceeding especially in the interlobular tissue, the case sinks into the ordinary chronic consumption, the common "phthisis," which may be healed by shrinking of the tissue (fibroid phthisis). It is in these cases that the patient is to be sent to Davos as soon as possible. If he regains his appetite and gets strengthened, we may prevent the softening of the indurated area. Should ever a larger part of the lung be affected, and shortness of breath be the result of the shrinking and the vicarious emphysema, Davos is to be avoided. Those patients had better go to the "South" to the Riviera, to Ajaccio, or to the Lac de Genève.

4. If the chronic catarrh of the pulmonary mucous membrane has attacked a large part of the lung, or existed a considerable time already, complicated with emphysema and dilatations of the bronchi, it is no longer suitable for Davos. As regards the disease of the larynx, it is a mistake to consider the slightest

affection of the mucous membrane or of the vocal cho
ing a counter-indication of Davos. Except the
granulosa, very often treated at Davos, most of t
are suffering from hyperæmia of the larynx caused by
tent cough and the matter passing through the glotti
improvement of the pulmonary disease increasing, t
æmia is diminishing by itself, as well as the comm
catarrh of the larynx. But as soon as the submucous
is swelled, giving rise to shortness of breath, or if ulc
tubercles of the larynx are formed, Davos will be of n

5. A great number of pulmonary diseases are tr
attacks of pleurisy, a certain amount of consolidation
ing remaining behind, a source of local irritation, th
giving rise to the formation of tubercle. We may, ho
vent the tuberculization of the lung by the arrestin
mountain climate and the method practised at Davos.
suffering from empyema had better stop at home to b
upon, and should not come to Davos until the tr
disease have nearly disappeared.

6. Asthma is to be cured at Davos if neither before n
attacks any catarrh or emphysema could be detected, i.
of pure nervous asthma. Dr. A. Spengler gives an
several cases of nervous asthma all cured by the curati
of Davos. Medicines never have been prescribed.

7. Now for the seventh indication. All people ove
indoor pursuits or impaired by other unsanitary
suffering from want of appetite, constipation, wea
hypochondria, attain the best results passing several
Davos; but they must not be more than about six
age, else they will become sleepless and lose their ap
mountain climate being too exciting for them.

General Treatment at Davos.—By this term I mea
how the patients are to be treated in the high altit
open, pure air, warm milk, and the Italian wine of Valt
ciently good food (a principal thing), cold washings an
the cold douche, the regular change of walking and
these things we are enabled to cure the cases inclu
above-mentioned indications. As to the five douches
Davos, they are furnished most properly with a hig
and well-informed servants, and are applied by nobo
physicians.

And now let us enter on the statistics, furnished by Dr. Spengler. 323 patients are treated by him from June 1877 till January 1879.

Prophylactic cases			19
Nervous asthma			7
First Stage—	...	...	131
a. Unilateral	...	112	...
Right lung	43	...	...
Left lung	69	...	...
b. Both lungs	...	19	...
Second Stage—	...	...	204
a. Unilateral	...	158	...
Right lung	106	...	...
Left lung	52	...	...
b. Both lungs	...	46	...
Third Stage—	...	...	50
a. Unilateral	...	45	...
Right lung	24	...	...
Left lung	21	...	...
b. Both lungs	...	5	...
			411

We have got 411 cases, because 88 of them, having both lungs affected, one in first, the other in second or third stage, are duplicates.

Cure	73
Improvement	190
Worse on account of too short a residence	18
Worse on account of the disease being too much advanced or the climate not being suffered	19
Died here	11
Died at home	14
Stationary	17
	342

You see the number of 342, 19 patients being treated twice and mentioned twice.

The limited space will forbid my entering into deta
lars of the statistics; beyond an outline sufficient to
the leading features of the indications of Davos, I di
to elaborate. My essay must be looked on as pro
not final. I only take the liberty to pass to an imp
tion, viz., the *hæmorrhages at Davos*.

Out of these 323 patients treated by Dr. Spengler,
rhages—

178 neither at home nor here;
126 at home, here never;
16 at home and here, *i.e.*, 5 per cent.;
3 at home never, but here, *i.e.*, 1 per c

Summing up, we find well demonstrated that 30
that is to say, 94 per cent.—never had any attack of
and yet at 39 per cent. of them hæmorrhage formerly
once or more. In 5 cases the hæmorrhage was fatal
died instantly, patients in third stage, 1 already dra
end when arrived at Davos; the 2 others died of exh
paralysis of the heart. The remainder very soon rec
hæmoptysis, and left Davos, 2 cured, 8 improved, 4 w

I am of opinion these reports may be able to destr
concerning the hæmorrhages at Davos.

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